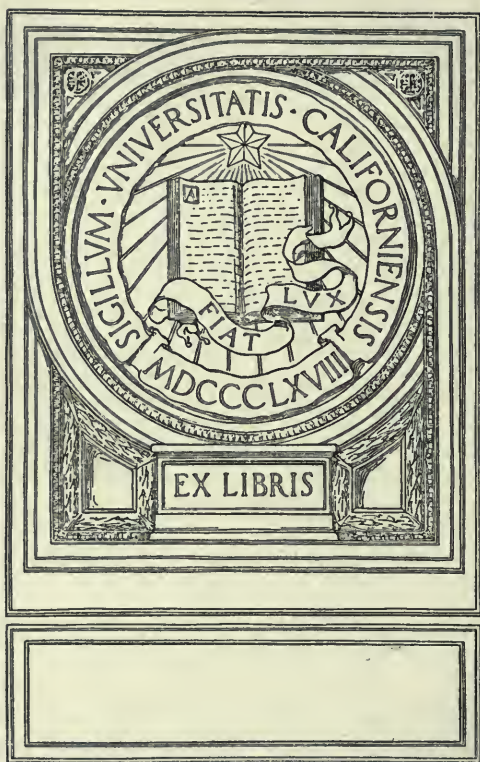
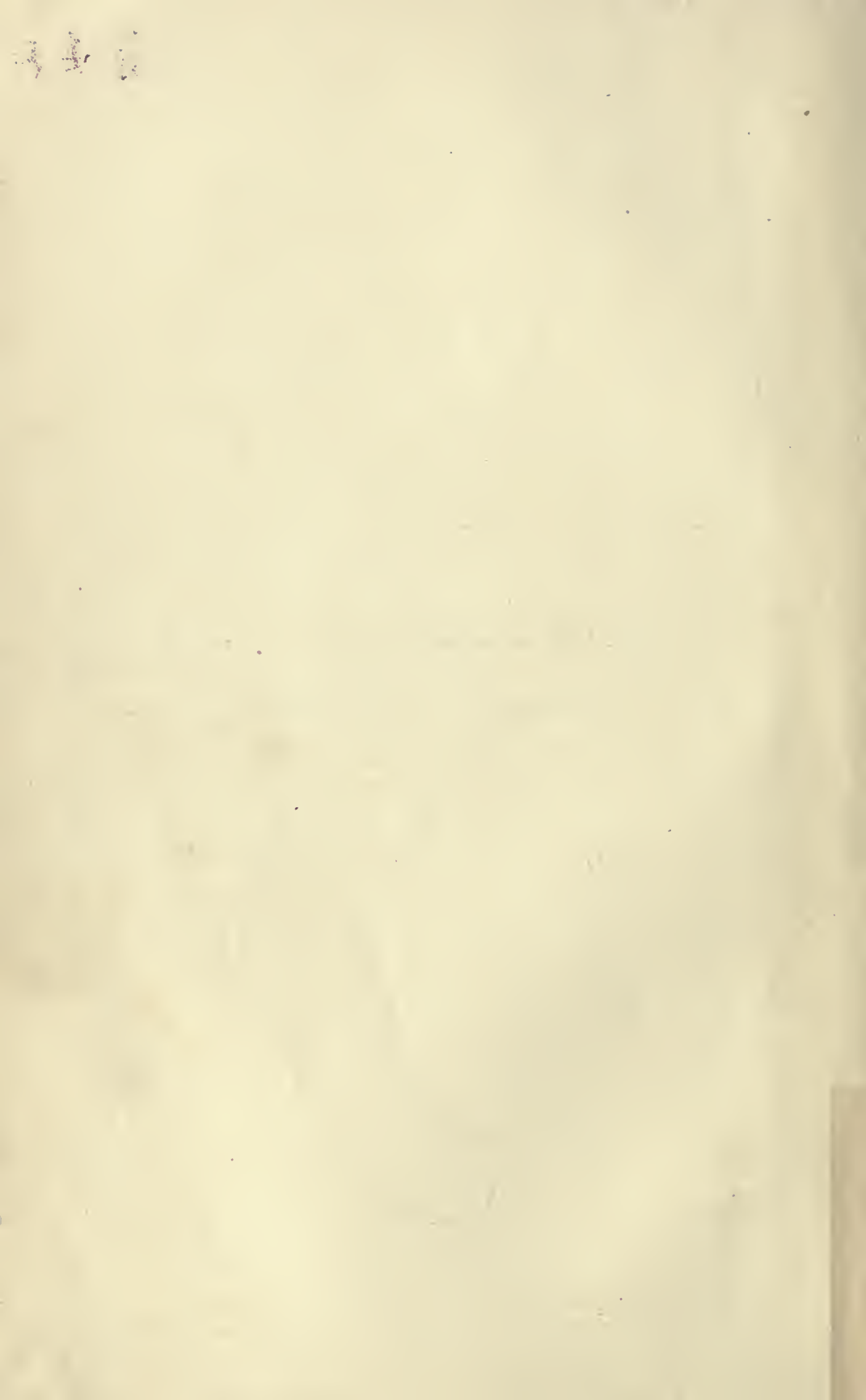






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THE
ART OF CANNING
AND
PRESERVING
AS AN INDUSTRY.

BY

DR. JEAN PACRETTE
OF PARIS

Formulas and receipts as actually used by the author and
prominent packers.

1901



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The Art of Canning and Preserving

AS AN INDUSTRY.

EARLY AGE.

From as far back as history may reach, finding ways and means by which to keep and prevent eatables from decaying, in other words, to preserve them, has been one of man's greatest and constant thoughts.

The various methods discovered by the most progressive brains at the different periods have been used by the men of the respective ages, enabling them to save the products of nature from one season to another in order to keep them from starving during the long hibernal months.

Undoubtedly the North, where the climate knows no clemency, has been the birth of what is now one of the largest industries of the world.

Drying grains, nuts, fruits, fishes, by hanging them in the open air during the fair season may be considered as the start, the first step made, every new step coinciding with, in fact, marking an advance in civilization.

Hunger having driven the prehistoric man out of his hole in the mountain, armed with stones, he went hunting in the valley covered with snow..... having satisfied his immediate wants, and those of his little ones, those dear little ones who had, dying from hunger and fear, waited his return, the man thought of the ferocious bear he had faced in the valley, of the fight to death he had won, of the cold of the water under the ice where he had caught the fishes..... What would have become of the dear little ones had he failed to overpower the big bear or to force his way through the icy storm?

"Avoid these dangers for thy beloved children's sake" was his conscience cry, appeal and order. Hence the necessity of keeping the remaining fish and meat for future wants. The famished wolves were howling at the entrance of the hole, since many days was the sun hidden behind a heavy curtain of snow, the man built a fire and hung the meat to dry.

Experience did teach him that not only the drying by the heat of his fire but the smoke saturating the meat made it keep long, longer yet, and still it was good to eat.

When the sun will again shine bright over the valley, when the valley will be green anew, the man will hunt and fish, save, dry, smoke and preserve.

The frost will find him without fear of the rigor of the elements. The little ones are safe.

The man on the seashore made the next step, he discovered the precious, the immense help offered by nature in the salt of the water. He made salt and salted the fish, he made more salt and exchanged it with the man of the mountain for meat and plants and by a series of progress the meat and vegetables were salted in the big earthenware jars.

The conditions of life were then rendered easier. The supply stored, and being assured not to suffer from hunger, time could be devoted to pick wild plants and seeds to aromatate the brine, to give flavor to the food, to render it palatable. The laurel, the mint, the onion, the garlic soon became necessities. Bold seamen returning from long and adventurous cruises brought the hot pepper, the nutmeg, the cinnamon, the tropical spices, they pleased the taste, from luxuries they became part of the brine where pieces of pork or beef were salted.

How long a time, how many hundred or thousand years elapsed between each stage of progress—we ignore, the memory of man is short; but here we reach the modern times and Appert, our great master, discovers and teaches the method by which eatables heated, after being air-tightly enclosed in receptacles, will keep and not decay for an unlimited length of time.

The principle of the annihilation by the heat of the destructive ferments, its contradiction to the belief of the time made a revolution, canning factories quickly spread all over France and later were established in other countries.

In the United States the preserving industry, still young, has taken an enormous growth, and each year the number of plants and their output largely increases. Each season sees new and more powerful machineries to prepare the fruits and vegetables, to pack them in tins, to seal and to process them. As long as the demand has been larger than the production, the only

ambition of the packer was to manufacture enough to meet the orders; but now that the means of production are we could say unlimited, the competition is felt, the prices are lowered, the packing industry alone remains a source of profit to the manufacturer who, by the quality of his goods, establishes the reputation of his brand. His goods are appreciated, called for, because they have merits besides the brutal nourishing principles that all food products contain.

Refinement of the taste gains all the social classes, palates are being more and more educated. The future belongs to the preserver who will keep up to date, to the canner who will be more anxious to improve the quality of his products than to increase his output. The others will, perhaps, manufacture much larger quantities, will do the hard work, will fight on prices, will hardly make a living. Should one of them, discouraged, retire from the field, no brain will be missing in the factory, a carpenter or a mason of yesterday, "canner" to-day, will take his place, the machine work will go on at the same speed, most likely with the same result.

The successful canner will manufacture preserves of vegetables in the spring, preserves of fruits during summer and fall, put up jams, jellies, fishes, meats and soups during the winter. He will be a man thoroughly knowing his line, the general expenses of his business will cover twelve months of "active" work. A body of practical and intelligent help will have steady employment all the year long in his factory; the extra hands will only be called when needed in the time of rush, for the cherries, the peas, the peaches and only the heavy work, where less care and skill is required, will be left for them to attend to under the vigilant control of the able and trained staff.

Our ideal Conserve manufacturer will be active and bright, he will not be the tool working at hard labor for the greatest benefit of some jobber. Our Preserver will place his goods on the market under his own name and not depend upon the others who care so little for him, to sell his own products. He will devote all his time, labor, skill and brain to his manufacture. The goods bearing his trade-mark will be relied upon; he will have a trade that is his and he will take a jealous care of it.

All goods have to be advertised, our man for this will rely on the quality; by it he will reach and summon the consumer to his aid; to the consumer he will devote all his solicitude; he is the only one who will appreciate his efforts, alone he will create, constitute and increase "the demand."

Receiving his good money full value, satisfied of the grade and quality of your production, the consumer will prove you his thanks in the most effective way by patronizing your brand, establishing your fame on solid basis and will still consider himself your obliged. Of course you must help this useful auxiliary you must remind him of your existence while in the grocery store, the originality and the neatness of your packages, the simplicity and tastefulness of your labels will do this. While in the shop your new friend must easily detect and recognize your goods. The pretty window and counter display of your finest goods in air-tight sealed glass jars will undoubtedly prove one of the most effectual and paying ads. A few hundred dollars and a little pain will pay for this and at the end of the year it will have done you good and left something behind.

Years of study under my illustrious and beloved master, the late Dr. Pasteur, have given me the theoretical knowledge, years of practical work have enabled me to illustrate and explain in this book how to handle to the best advantage the raw products of nature. The so much honored "art of cooking" has again gained the rank it merits and to-day the food products are the subject of the constant solicitude and study of our greatest scientists and law makers. With all the sensible preservers we applaud to the Pure Food laws because they protect the honest man whether he be producer or consumer.

PRESENT DAYS.

The public in the grocery store buys canned goods, relying mostly on a promising label with high color contrasts; he knows nothing of what he will get when opening the can. He finds himself in the presence of goods marketed under assumed names, sold to the retailer by a large dealer whose aim is to buy the cheapest possible and do the manufacturer, anxious to realize, to the extent the poor man can stand. This buying the cheap-

est is often done to the great detriment of the quality; the manufacturer who has paid the expenses of the squeezing act will try to get even to the greater detriment of the already decreased quality—the retailer does not know what he gets, he supposes it to be all right, his clerks represent it to be such.

Poor consumer! How could he know what he is going to have until he has paid for and there is nothing left for him but to acknowledge that he has been defrauded once more. The breach of trust will be so much greater that the unscrupulous canner has used greater artifice and skill to hide and conceal, by unloyal processes, the real nature of the goods. And still the consumer is not at the end of his troubles, until he finds the brand, the reliable one, which in the future will be his sure, trusted and unbetrayable guide.

The actual Pure Food laws enforced in their real spirit are the greatest friends of the straight, honest preserver; they bar out all the fakirs and defrauders who indignantly abuse the public and prevent the loyal goods to be worth their value. To allow these products on the market would be giving a premium to fraud.

These are highly moral and human laws; they protect the public health, they protect the mother and the child, the rich as well as the poor. We sympathize with their promoters.

STERILIZATION.

HOW TO DETERMINE THE PROCESSING REQUIRED.

Preserving is nothing more than enclosing edibles in air tightly sealed vessels and submit the whole to the action of heat for a sufficient length of time to permit the heat to penetrate the inside of the receptacle and the very heart of the fruits or eatables it contains. Every particle contained in the vessel must be heated at a temperature not less than 170° Fahrenheit, at which temperature all the ferments adult (microbes) are killed. But should the sealed vessel be placed in a bath of 170° Fahrenheit, it would require days in order that the inside of the jar should reach that temperature.

Certain products are easily penetrated by heat, others more difficultly. After a little experience the preserver is able at a

glance to determine this and will accordingly "process," this is to say leave the sealed vessels in boiling water or steam bath for a shorter or longer time.

Should the vessel contain a light liquid, plain fruit juice per example, a very short processing would be required. If the can or jar contains fruits in water the length of the processing will be increased as it is not only necessary that the liquid contained in the jar reaches 170° , but this liquid must become heated to such a degree as to transmit to the fruit the temperature of 170° . It will require some time for the heat to reach the inside of the fruit, therefore, the larger the fruits the longer the processing. If the fruits contain stones, the processing will again be increased, the heat after penetrating the fruit having the inside of the pit to reach, otherwise should the ferments naturally contained in the stones not be killed by the heat, they would within a short time develop, invade the fruits, the liquid and the whole contents of the vessel would ferment, spoil and decay.

If the liquid is heavy, such as sugar or glucose syrup—jams, jellies, etc., it will still be more difficult for the heat to penetrate it, the length of the processing should be increased.

BLANCHING.

The acids contained in the fruits are mostly citric and tartaric; after the processing they remain in the same state, such is not the case with the vegetables. The numerous and various acids they contain resume their chemical action after the processing is over and this will effect and change the appearance and taste of the vegetables; this would be bad enough in itself, but these acids do worse, they practically digest the mealy substance of the plants creating a sort of hot bed in many respects similar to the "Culture Bouillon" of the laboratory.

I have stated that at the temperature of 170° Fahrenheit the ferments were destroyed—this is correct, but besides these actually living bacilli, which the heat has killed, the vegetables contain others not developed, practically not alive yet, but actually existing. They are eggs, or seeds, or spores, and would so remain should it not be for this chemical digestion, this hot bed which practically hatches them. They develop, and soon the whole contents of the airtight sealed vessel will be in complete decomposition.

BRINE.

The situation is not desperate, not in the least. What is required is to eliminate these acids. We will therefore "blanch" boil in water the vegetables, before canning, in order to dissolve and eliminate these acids; then we will put them in vessels, seal air tightly and process. But small, very small, particles of these acids may still be there; they will not have any chance to do mischief; the water of our sealed vessel is salted to a sufficient degree to absolutely protect the mealy substance against the action of these weakened acids. (The brine for vegetables is one quart of salt to fifty quarts of water.)

These terrible acids are now harmless. Our can or jar will keep for years and years.

HOT DIPPING.

Not only the salt, but the sugar, the glucose, etc., are good "Preservers."

For this reason, if you pour hot boiling syrup over fruits contained in vessels, the temperature of this boiling syrup is at least 212° , and therefore cannot contain any of these microbes which are killed at 170° . The amount of heat contained in this syrup will be sufficient to nearly kill all ferments contained in the fruits; therefore, if the vessels are promptly sealed, a very short processing will be sufficient to complete the destruction of the micro organisms.

If the sugar syrup has been poured cold over the fruits and the vessels afterward airtightly sealed it will be necessary to give a very much longer processing, not because the cold syrup has not the same effect as the hot syrup, but simply because it requires a long time for the heat to penetrate a heavy liquid such as sugar syrup. In fact, our aim is not to cook the vegetables in the sealed receptacles, but to "Preserve" them. A very long processing would result in overcooking the goods, especially the parts which are on the sides of the cans or jars, as all the heat on its way in goes through and is transmitted by them. To remedy this the sealed vessels are submitted to processing under pressure at higher temperature, say $225-240^{\circ}$ Fahrenheit, in a closed

retort. The temperature all around the can or jar being 240° its inside will, within a few minutes, reach 170° . This is all we desire; we turn off the steam and all is over; the goods have only been under the influence of heat for a very short while. This is especially desirable for the preserves of vegetables.

COOLING OFF—CANS AND JARS.

If the nature of the goods is extremely delicate and liable to suffer by the heat, cool off the cans by turning on them a stream of cold water. This is especially advisable for large cans because the larger the can the longer it will take for the heat to reach the middle of the receptacle, therefore the longer the processing. Suppose you have to process your cans one hour, this simply means that for this size of can filled with this specified product it will require sixty minutes for the heat to reach the very middle of the can. In other words, the very centre of the can will have been heated at 170° or perhaps a little more for, say, one minute's time, while the parts of the goods in contact with the sides of the receptacle will have been maintained at a temperature of nearly 212 or more during sixty minutes.

If these big cans piled one over the other would be allowed to cool off by themselves, it would require a long time during which the products near the sides would be maintained at quite high temperature, thus cooking them further. I have stated before, our aim is to preserve in the cans, not to cook, and much less to overcook; for this reason we will drive a stream of cold water on the cans so that the outer part will cool quickly. We will not leave the stream on until the cans are absolutely cold because we do not desire to cool off the middle of the can; it has not been long under high temperature and it will do it no harm to remain hot for a while.

Personally I prefer cooling off by laying the cans on the floor one inch apart; it prevents the rusting of the cans, but it requires lots of room and more handling.

The glass jars we cannot cool off with cold water even cold air; a draft might cause some of them to crack and break. But the brisk cooling off is not a necessity; its object is to secure an even cooking of the contents of the sealed vessel, and as for glass

jars we are not in such a hurry as we are for the cans; we will operate as follows and obtain same results, if not better.

We will give a shorter processing, but will allow the jars to cool off for, say, ten to fifteen minutes in the water of the kettle in which the processing has been made.

During the processing the heat was transmitted from the exterior of the jar towards the interior, and say it took twelve minutes' processing for the heat to reach 212° in the inside, at this time we turn off the steam. At this very moment the outer part of the jar has been submitted for twelve minutes at 212° , the centre of the jar just reached this temperature and the whole contents of the jar is actually at the same temperature of 212° .

The steam being turned off—the water of the bath stops boiling and its temperature gradually decreases, it cools off very slowly; the jar being still in the bath will also gradually cool off. If it has taken twelve minutes for the heat to penetrate and reach the centre of the jar, for the same reason, being in the same water bath, it will take twelve minutes to the cooling off to gradually reach the center of the jar. Therefore after this time the whole contents of the jar will have been submitted to the same temperature and for the same length of time.

From this it derives that fruits in liquid will require less processing than fruits packed tight and without liquid; that bottled bouillon will require less processing than soups with pieces of meat in. That heavy soups will require less processing than meat, and pieces of meat less than a chicken or rabbit that would be canned whole with its bones.

AIR ENCLOSED IN CANS AND JARS—VACUUM.

The air is more easily penetrated by heat than any of the therefore, the microbes it contains are the very first to be killed. liquids we are liable to meet while in the preserving factory; We all agree on this. Then, creating a vacuum or exhausting the air is and remains a nonsense.

Everything can be preserved; nothing is hard to keep, but each product has to be submitted to the action of heat for the time required by the heat to penetrate it.

If you put up goods which are partially or totally spoiled, fermented and covered with mold, they will keep; they will be preserved just as well if the length of time of processing has allowed the heat to penetrate the whole contents of the receptacle. The whole contents will be pasteurized and it will not spoil any further. The mold is nothing else but a mushroom, a vegetable; it will be preserved same as any other vegetable.

CANS—SEALING—VENT HOLE.

If your goods are put up in tin cans, it does not matter how the can is sealed as long as it is airtight.

As far as the keeping is concerned, it would make no difference of what kind of metal the can is made, but it has to be made of tinplate simply because other metals would generate products injurious to the human stomach, while the tin does not.

The sealing of the cans with pure tin is not practicable, this metal being too fusible, and experience proves that two-third lead added to one-third of tin is hardly attackable by the acids of the fruits. Resin should always be used when possible, the chlorhydric acid being liable to combine with the lead of the solder, producing poisonous lead salts which, if absorbed, may cause death.

I will leave to the manufacturer to judge if he should use cans with a vent hole, and process in two separate operations. It is extra work generally done without any especial advantage, therefore I will give the length of heating for the various products for the "Processing" in one operation.

PACKING IN GLASS.

In reference to the packing in glass jars this branch takes each year more and more importance, one of the drawbacks, in fact, the reason which has kept for years this part of the packing far behind the ranks it merits and should always have had, was the lack of a practical means to obtain an airtight seal which would allow to process the glass packages same as tin cans.

The wrong idea that the air had to be driven out of the jars, had to be exhausted, has for years caused all the efforts in this line to point in the wrong direction.

I feel here in honor and duty bound to pay a public tribute to the officers of The Phoenix Cap Company of New York, to the courtesy of which the writer is greatly indebted for the good they have done to the country, and it is real pleasure to me to state that the years they have spent in study and experiment have resulted to the greatest benefit of the producer, the preserver and the consumer.

PRESERVING OF FRUITS.

Fruits come first in the preserving line; they are prepared in different ways, but always put up in water or sugar, and it only requires care and cleanliness to obtain first-class products. It is a crime to spoil the gifts of nature. Handle them carefully, your solicitude will be rewarded. You will feel proud of your products, and the premium they will command will pay you well for your troubles. It is cheaper to make good than bad.

Under the heading of each fruit I give the best formulas for the various kinds; however, a general formula can be given by which all fruits can be treated.

FRUITS IN WATER—PACKING AND PROCEESSING.

Fruits in water are merely bottled or canned, covered with fresh cold water which has been boiled previously or with hot water directly. The jars or cans are airtightly sealed and processed:

Small fruits with stones, quarts 10 minutes.

“ “ “ “ pints 8 “

Large fruits with stones, quarts 12 minutes.

“ “ “ “ pints 10 “

Pitted fruits, quarts 8 minutes.

“ “ pints 6 “

By small fruits we understand cherries, small plums, etc.; by large fruits the peaches, apricots, etc.; by pitted fruits the peach ears, pears, etc.

CRUSHED FRUITS.

Crushed fruits are especially put up for the soda fountain trade. Crush or grate the fruits, throw them in a kettle of hot

boiling syrup at 28° Beaume, boil three minutes, can or bottle and process.

Gallons,	40	minutes in boiling water.
Half Gals.,	25	“ “ “ “
Quarts,	15	“ “ “ “
Pints,	10	“ “ “ “

FRUIT PULP.

Boil your fruit five minutes with about one quart of water for each twenty pounds of fruits, can and process.

Double gallons,	3½	hours in boiling water.
Gallons,	2½	“ “ “ “

or,

Double gallons,	45	minutes at 235° Fahrenheit.
Gallons,	30	“ “ “ “

These fruits are used in winter time to make the jams. If you use double gallons they ought to be made of tin plate lacquered on one side, which will be on the inside of the can. This will enable you to use them time and time again; the acids of the fruit will not corrode them.

APPLES IN WATER.

Dip the apples in boiling water for one minute. cool off in cold water, put in cans or jars, cover with plain or sweetened water, seal and process.

Cans, quarts,	8	minutes in boiling water.
“ pints,	6	“ “ “ “

and cool off with cold water.

Jars, quarts,	6	minutes in boiling water.
“ pints,	4	“ “ “ “

Allow the jars to remain in the hot water for about five minutes to cool gradually.

CHERRIES IN WATER.

Pitted, sour cherries are the only ones used. Put in bottles only and cover with water, seal with large corks and wire the neck,

then process in open bath for fifteen minutes. The water has to be lightly colored with carmine (carmine No. 40 preferred).

CHERRY PULP.

Put the pitted cherries in the kettle with one pint of water for each ten pounds of fruit, stir and boil five minutes, can and process.

Gallons, $2\frac{1}{2}$ hours.

Double gallons, $3\frac{1}{2}$ hours.

GREENGAGE PULP.

Pit the greengages and boil five minutes, stirring slowly so as not to break the fruit; add to this one quart of water to each twenty pounds of fruit, can and process.

Double gallons, 45 minutes, 235°

Gallons 30 " 235°

PEACH PULP.

Use ripe, full flavored fruit if possible. Pit them and boil four minutes, adding one quart of water to each twenty-five pounds of fruit, can and process.

Double gallons, 3 hours in boiling water

Gallons, 2 " " " "

or

Double gallons, 45 minutes at 225°

Gallons, 30 " " 225°

APRICOT PULP.

Ripe, full flavored fruit only give a good pulp which will find a ready market for confectioners use, and also make high grade jams.

Cut the apricots in halves and boil five minutes with water, one quart for each twenty-five pounds of fruit. Save the stones; they will be useful later. Seal and process.

Double gallons, $3\frac{1}{2}$ hours in boiling water.

Gallons, 2 " " " "

or, respectively, 45 and 30 minutes at 235° .

STRAWBERRY PULP.

Boil in kettle two minutes with one quart of water for ten pounds of strawberries, can and process.

Gallons,	30 minutes in boiling water
Double gallons	45 " " " "



FIG. 1.
English
Gooseberry Jar

RASPBERRY PULP.

Prepare same as strawberries.

GOOSEBERRIES IN WATER.

Use green gooseberries, bottle, cover with water, seal airtightly and process.

Quarts,	12 minutes
Pints,	7 "

WHOLE PINEAPPLES IN WATER.

Peel with machine, put in can or jar, seal and process. Same time for both cans and jars.

2 hours in boiling water
or
45 minutes at 225°

RHUBARB IN WATER (English style).

Cut in pieces from 1 to 1½ inch long. Bottle raw with plain water and process 15 minutes.

At the beginning of the season when the rhubarb is young and tender, ten minutes is sufficient.

FRUITS IN LIGHT SYRUP—PACKING AND PROCESSING.

For this the fruit has to be blanched—this is to say, boiled in water until softened—then briskly thrown in cold running water to cool them as quickly as possible; this will make them hard again; can or bottle, cover with syrup at 18° Beaume and process.

Quarts,	15 minutes in boiling water.
Pints,	9 " " " "

Increase two minutes for large fruits such as pears, and reduce two minutes for small fruits such as cherries, etc.

If your fruits are soft, such as pears, cool them in cold water after the blanching, adding to this water one ounce of alum for each three gallons.

If you handle apples or bananas, in fact, all fruits which you desire to remain perfectly white, do not leave them in contact with air when they are peeled, but throw them in water containing one ounce of sulphite of soda to each six gallons of water. The sulphite is a powerful whitener as well as an anti-septic. Fruits in this water will not ferment; added in small quantity to the water when blanching, it will whiten the fruit.

PRICKING OF THE FRUITS.

Such fruits as cherries and greengauges do not require blanching; they are put up directly in the cans or jars, sealed and processed; in this case they should be dipped with syrup at 28 to 30° Beaume.

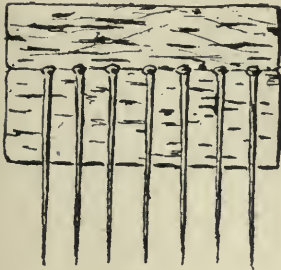


FIG. 2

These fruits absorbing syrup during the processing will slightly swell, thus causing the skin to burst, spoiling their appearance and clouding the syrup. This is easily avoided by pricking the cherries or plums with copper needles (steel needles would produce black spots). For this stick a dozen needles or pins through a cork about 1½ inches in diameter and ½ inch thick, push them through to the heads, cover them with another piece of cork, and it will be very convenient to handle.

FRUITS IN HEAVY SYRUP.

Fruits in heavy syrup are prepared same as the "candied fruits"; after they have been for three days in the syrup, which, by the previous boiling, has reached 28° Beaume, they are bottled, dipped with 29° syrup and processed as the fruits in light syrup. The processing should be twice as long if the syrup is put in cold.

WIESBADEN FRUITS.

Wiesbaden fruits are practically fruits which have been thoroughly candied. They are bottled and covered with 32° syrup hot, perfectly clear and processed at 212° Fahrenheit.

Quarts, 12 minutes.

Pints 8 “

The dipping syrup is to be two-thirds sugar, one-third glucose.

APPLES IN SYRUP.

Select fruit which is not over ripe. Peel, core and throw them in cold water containing one ounce of sulphite of soda to each four gallons. This will prevent them from turning brown. One ounce of alum in five gallons of water will give about the same result. Put them in cans or bottles and cover with a warm syrup at 18° Beaume, to which add one ounce of lemon-peel alcoholic infusion to each five gallons of syrup; then process.

Quart cans, 18 minutes in boiling water

Pint “ 10 “ “ “ “

Quart jars, 12 “ “ “ “

Pint “ 8 “ “ “ “

PEARS IN SYRUP.

Select pears which have not reached their maturity. Peel the fruit and throw them in a bucket of cold water containing one ounce of sulphite of soda to each seven gallons of water. Blanch them in the same water—this is to say, place the fruit in the basket of the kettle—cover with the sulphite water and slowly bring to boil. (See blanching kettle.) As soon as they have become softened remove the basket from the kettle and dip it with its contents in a cold water tank, allowing a stream of cold water to run into it for five minutes. Put them in cans or jars, cover with cold syrup of proper strength for the market for which the goods are prepared, add to the syrup a few grains of vanilla to flavor it; then process.

Quart cans, 16 minutes in boiling water.

Pint “ 12 “ “ “ “

Quart jars, 13 “ “ “ “

Pint “ 10 “ “ “ “

Allow the jars to remain in the processing tank for ten minutes to cool off gradually. If the pears are not perfectly white after the blanching and cooling in the cold water bath, it is necessary to bleach the fruit in sulphur fumes for six hours before blanching. When canning or bottling it is advisable to peel the stems of the pears so as to make them perfectly white; it greatly adds to their appearance.

If they are fine, soft pears, cut them lengthwise and core them. Blanch in very light syrup instead of water, put in jars and process.

Quart cans,	12	minutes	in	boiling	water.
Pint	"	8	"	"	"
Quart jars,	10	"	"	"	"
Pint	"	6	"	"	"

Allow the jars to remain in the processing tank for ten minutes to cool off gradually.

PINK FANCY PEARS.

The pears may be colored pink (but demand for same is limited) by preparing as follows:

"After the pears have been blanched and cooled in water, place them in earthenware jars and pour over same a hot syrup at 25° Beaume, with

Carmine for clear pink,
Cudbear for wine red coloring.

Add 1-8 ounce of alum per gallon of syrup to fix the color. Aniline colors also give very good results, covering the fruit evenly."

COOKING PEARS.

Should the pears be of the cooking variety, after peeling, stick several times a long, large copper needle through the core from the eye to the stem; then blanch them thoroughly.

QUINCES IN SYRUP.

Peel, slice and core the quinces. Put them in cold water and heat slowly until it reaches boiling point (but do not boil),

pick the slices with the skimmer and throw them in a bucket of cold water containing one ounce of sulphite of soda for each six gallons. Put in cans or jars, cover with syrup of the required strength for the market for which they are prepared; then process.

Quart cans, 20 minutes in boiling water.

Pint " 15 " " " "

Quart jars, 15 " " " "

Pint " 12 " " " "

Use apple quinces if a light color is desired, and pear quinces if a darker color.

CHERRIES IN SYRUP.

The common way is to fill the cans with the fruit, cover with sweetened water, seal airtightly and process.

Quart cans, 12 minutes.

Pint " 8 "

Quart jars, 6 "

Pint " 4 "

For first-class goods the cherries must not be ripe and be pink instead of red. To prevent the skin from bursting while cooking, prick the fruit with copper needles, soak the cherries in cold light alum water for 15 minutes, then blanch and cool off in cold running water.

If they are red cherries it is advisable to put them in cans that are lacquered on the inside. The cans are dipped with light syrup, slightly colored red with carmine for the red cherries. Seal and process.

Quarts, 10 minutes.

Pints, 6 "

If the cherries are put up in glass jars, process

Quarts, 4 minutes.

Pints, 3 "

"WIESBADEN CHERRY COMPOTE."

Take cherries, white or red, which have been candied, fill the jars and pour over hot fresh, clear syrup, 2-3 sugar and 1-3 glucose, at 32° Beaume, seal while hot with Phoenix cap lined with composition washer and parchment paper disc. The regular Wiesbaden shape jars should be used. Fig. 3.

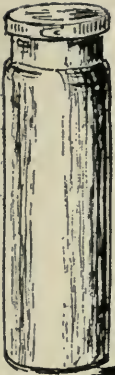


FIG. 3

"CHERRIES IN MARASCHINO."

Drain the syrup of nice, pink colored, candied cherries, boil part of it, reducing its strength to 12° Beaume by addition of water, pour hot over the cherries and drain immediately. Bottle your cherries and cover with liquor prepared as follows:

Drained, filtered syrup, 20 parts.

Water, 30 "

Maraschino extract, 1 "

The strength in sugar may be increased. The jars are to be airtightly sealed and processed.

Quarts, 15 minutes in boiling water.

Pints, 10 " " " "

"MARASCHINO EXTRACT."

This formula produces the finest and softest flavor and costs about 15c. per quart.

Mix and crush together:

Cherries, 85 pounds (black wild cherries if possible);

Raspberries, 18 pounds;

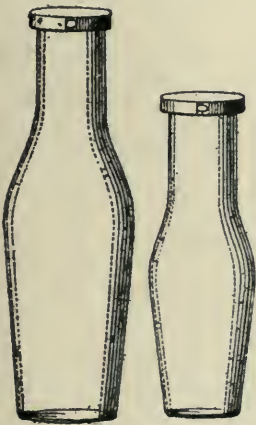
Dried cherry leaves, 6½ pounds;

Peach stone almonds, 1 pound;

Powdered iris root, 4½ pounds;

Hot water, 21 gallons.

Distill to obtain 10½ gallons of extract.



F.G. 4

GREENGAGES IN SYRUP.

Use unripe fruit; prick them with the copper needles; do not remove the stone or pits, and throw them in cold water contain-

ing one ounce alum to each three gallons of water. Leave them for about one hour; then put them in the kettle with fresh, cold and curls under the influence of heat. To prevent the flesh from water; heat slowly, as this fruit is very delicate. The skin breaks losing its bright green color add a few grains of "Emerald green" aniline color to the water of the kettle. Do not let this water boil, but as the fruits come to the surface pick them up with a skimmer and place them in cold water to which has been added one ounce of alum to each five gallons of water. Leave 15 minutes, then rinse by letting cold water run into the tank or bucket containing the greengages. Put in cans or jars, fill with syrup of required strength and process.

Quart cans, 10 minutes in boiling water.

Pint " 7 " " " "

Quart jars, 7 " " " "

Pint " 5 " " " "

Allow jars to remain 10 minutes in processing tank to cool off gradually. Syrup marking 26° Beaume when boiling is best, as its strength helps the fruit to remain whole.

All other plums are treated the same way, omitting the green coloring if they are of the red or yellow variety.

PEACHES IN SYRUP.

Use only firm, white peaches, if high grade goods are desired (the green ones may be used for pulp).



Jar for Apricot
Ears.

Peel the peaches, cut in two and throw them in cold water containing exactly one ounce of alum and $\frac{1}{4}$ ounce sulphite of soda for each seven gallons of water. Leave until cooled off, drain, put in cans or jars and dip with hot syrup; then process.

Quart cans, 10 minutes in boiling water.

Pint " 8 " " "

Cool off the cans with cold water.

Quart jars, 5 minutes in boiling water.

Pint " 3 " " "

Allow the jars to remain five minutes in the bath to cool off gradually. Whole peaches are treated same way, but process five minutes longer.

APRICOTS IN SYRUP.

Use almost but not ripe fruit, a little green yet being preferable. Too ripe fruit would break and not retain their shape. Peel, cut in two and leave in cold water until ready to put them in cans or jars. If ripe apricots are used do not peel them, as they would fall to pieces during processing. Put the fruit in the cans or jars and dip with hot syrup of required strength. A hot syrup prepared at 24° Beaume will have the best strength to help the fruit to remain whole. A few peeled pits in each jar will greatly add to the flavor and appearance. The heavier the syrup the longer the processing. The proper time for the above will be:

Quart cans,	10	minutes	in	boiling	water.
Pint	"	8	"	"	"
Quart jars,	6	"	"	"	"
Pint	"	3	"	"	"



Jar for whole Apricots, Pears, etc.

WHOLE APRICOTS IN SYRUP.

Whole apricots make a fine preserve, the stones and pits giving a superior flavor.

Prick with copper needles and throw in cold water containing one ounce alum for each ten gallons. Leave two hours, drain and put in cans or jars. Use same syrup and process as for apricot ears. Should the apricots be too green, it is advisable to slightly color the syrup with "orange" color, sold by all confectioners' supply dealers. The addition of one ounce of sulphite of soda to each six gallons of syrup prevents fermentation and helps to preserve the fruit.

STRAWBERRIES IN SYRUP.

(Wiesbaden Strawberries.)

This fruit put up in syrup does not remain whole unless it is candied; it is then known as Wiesbaden strawberries.

The common grade is prepared as follows: Fill the cans with strawberries, pour over a cold syrup at 28 Beaume and process.

Quart cans,	7	minutes	in	boiling	water.
Pint "	5	"	"	"	"
Quart jars,	3	"	"	"	"
Pint "	2	"	"	"	"

Leave the jars about five minutes in the processing tank so as to cool gradually.

A higher grade may be made as follows:

Fill the jars with the strawberries, pour over cold syrup at 30° Beaume and leave over night, drain the syrup and refill the jars with cold syrup at 26° Beaume; then process as stated before.

The jars should be laid flat for 20 days in a dark place before shipment; this will allow the fruits time to absorb sugar and become of the same density as the syrup; otherwise the berries will accumulate at the top of the jar.

For the high grades take strawberries partially or totally candied. If partially candied put in jars, cover with cold syrup at 25°; process same as above. If strawberries are fully candied heat the stone jar containing them, drain the syrup, boil it, reducing its strength to 25° by addition of water, and pour over the fruit to wash them. Leave one hour, drain, and bottle the berries. Fill the jars with hot, bright syrup containing 1-3 glucose at 30 to 31° Beaume. Seal the jars while hot. Same as for Wiesbaden cherries.

RASPBERRIES IN SYRUP.

Raspberries are treated in the same manner as the strawberries, and the same processing is required.

RED CURRANTS IN SYRUP.

Use a nickel, silver or celluloid comb to separate the currants from the bunch. Pack the currants tightly into the jars and pour over them a hot syrup marking 20° Beaume. Seal and process two minutes in boiling water.

“BAR-LE-DUC” JELLY.

The Bar-le-Duc jelly is the finest jam that is in existence, and is made in the city of Bar-le-duc in the east of France, which up to date has had the monopoly of its preparation.

Take each currant in your hand and with a rye straw pick the pits through the hole left by the stem. When you have a stone jar 2-3 full pour over warm syrup marking 26° Beaume. Leave it stand two days, pour in kettle and bring slowly to boiling. Put it back in the stone jar. Repeat the operation four times. At the last operation the strength of the syrup has been considerably increased by the subsequent reheating. Should it be too light a little sugar may be added. Put in glass jars while hot, leave uncovered for ten days on a table, and the surface of the jelly will thicken and turn harder.

The white currants are treated in the same way, but the jelly is slightly colored yellow pink. To make it very white and clear add to the first syrup one ounce sulphite of soda to each five gallons of syrup. Do not process the jars, as the jelly would turn dark, and this is to be avoided.

BLACKBERRIES IN SYRUP.

Fill the jars with blackberries, cover with 26° syrup, seal and process.

Quarts, 12 minutes in boiling water.

Pints, 7 “ “ “ “

GOOSEBERRIES IN SYRUP.

Take green gooseberries, put them in jars, cover with syrup at 26° Beaume, seal and process.

Quarts, 12 minutes.

Pints, 7 “

PINEAPPLES IN SYRUP.

Peel and slice the fruit, bleach over night in the sulphur closet; if a light lemon color is desired, wash in cold water, then transfer in a kettle of boiling water for two minutes, then drain and can or bottle.

Dip with syrup at 16° Beaume, made with the water in which the pineapples were blanched, if you desire the full flavor. Seal and process.

Quart cans,	15	minutes	in	boiling	water.
Pint	"	10	"	"	"
Quart jars,	10	"	"	"	"
Pint	"	6	"	"	"

A simple process is to can or bottle the sliced fruit without blanching, cover with syrup at 18° Beaume, seal and process.

Quart cans,	30	minutes	in	boiling	water.
Pint	"	20	"	"	"
Quart jars,	25	"	"	"	"
Pint	"	8	"	"	"

BANANAS IN SYRUP.

All the syrup used for this fruit should be at least 2-3 glucose.

Take green bananas, peel them with the fingers (do not use any steel knife), throw them in water containing one ounce sulphite of soda to each three gallons of water. After one hour can or bottle and cover with hot syrup at 28°, flavoring same according to taste with vanilla infusion about 1 to 200 parts, or orange, lemon or mandarin peel alcoholic infusion. Also add to the syrup a small quantity of citric acid. Seal and process.

Quart cans,	8	minutes	in	boiling	water.
Pint	"	5	"	"	"
Quart jars,	2	"	"	"	"
Pint	"	1	"	"	"

Cool the cans with cold water.

Leave the jars in the hot water to cool off gradually.

FIGS IN SYRUP.

Take small, unripe figs, prick them all over with the copper needles and also from the stem to top through the heart with a larger needle. Blanch them in boiling water with very little alum, cool off in cold, running water, put in stone jars and cover

with hot syrup at 24° Beaume. After twelve hours drain and reboil at 24°, then cover again. Give one more operation with 25° syrup, and two with syrup at 26°. Can or bottle, cover with hot syrup at 26° Beaume, seal and process.

Quart cans, 10 minutes in boiling water.

Pint " 6 " " " "

Quart jars, 6 " " " "

Pint " 5 " " " "

The cans should be cooled off with cold water. Allow the jars to remain a few minutes in the hot water to cool off gradually.

This is the general way of preparing the figs; however, we must add that the appearance of the figs has a great deal to do with their sale, and on their color depends their appearance. Therefore, should the nature of the figs you employ not have a nice green color after the last operation, it is easy to remedy. Should they have a faded yellow color, drain the syrup, reboil it, color it lightly with "Emerald" green, then pour over the figs. Three days after, the figs will be of desired color. When treating figs of the same nature again, you may color them green right at the start by giving them a second but short boiling in water in which you add the color and cool in clear, running water.

If the contrary has happened—this is to say, if the figs after the five syrup baths are of a black green—then operate as follows:

After the figs have been pricked with the needles as described, place them in the sulphur closet over night, blanch in water to which has been added one ounce sulphite of soda to each four gallons of water, then cool in cold, running water. Put in syrup as aforesaid.

Some manufacturers color the syrup used to fill the jars or cans with "orange" aniline color. If instead of "green figs," "gold figs" are desired, place them in cold water after removing from the sulphur closet for one hour. Then return them to the sulphur closet for 12 hours more and continue the operation as described. The figs obtained will be a clear gold yellow and very attractive; but the two operations in the sulphur closet are necessary to remove all the green.

If you use fruit with very heavy skin, it is necessary to peel them, and as all the color is in the skin, it is necessary to color them either green or gold. Do not blanch these in water, but put direct in sulphur.

MELONS IN SYRUP.

Select unripe melons with prominent ribs, as it improves their appearance, peel them, making peel not over 1-32 inch in thickness, slice the melons, following the ribs, putting aside all the seeds, and lay the slices in salt water (10 to 12 per cent. salt) for one week. During this time the melon will give out a great part of the water it contains, and the sugar will penetrate it easier. But as the operation softens the tissue of the fruit, it is necessary to blanch them in alum water, bringing them slowly to boil; cool with plenty of cold water.

Lay them in stone jars in such manner that they will all be in contact with the syrup. Pour syrup at 20° Beaume over the fruit, being careful not to have it too hot, repeating the operation twice the first day. To the first syrup add one ounce of sulphite of soda for each four gallons of syrup. After this drain every two days, raising the syrup one degree each time until 26° is reached. Pour the syrup warm, never boiling hot. Can or bottle, cover with hot syrup at 25° Beaume, seal and process.

Quart cans, 12 minutes in boiling water.

Pint " 8 " " " "

Quart jars, 10 " " " "

Pint " 6 " " " "



Jar for Chestnuts, Plums, Berries, etc.

RHUBARB IN SYRUP.

Cut in pieces from 1½ to 2 inches long. Put the raw rhubarb in the jars and cover with hot syrup at 25° Beaume.

Seal and process 15 minutes.

CHESTNUTS.

Take candied chestnuts and place them in cans or jars, and add to each a small vanilla bean (of those used to flavor the syrup when candying) and cover with 30° Beaume syrup. Seal and process.

Quart cans,	10	minutes	in	boiling	water.
Pint	"	6	"	"	"
Quart jars,	7	"	"	"	"
Pint	"	5	"	"	"

GREEN ALMONDS.

Take large unripe almonds, but soft enough to permit piercing through with a needle. Throw them in a very strong potash bath, strong enough to dissolve the outer wooly skin in 30 minutes. Stir at intervals to bring all the almonds and all their surface in contact with the potash. Rinse in cold running water for 15 minutes, after which time boil them in water containing one ounce sulphite of soda to each four gallons of water until softened. Rinse in cold, running water, pour back in the kettle and bring to boil in water lightly colored with "emerald green" (aniline color). Place the almonds in the stone jars, cover with boiling syrup at 18°. Leave it stand for 24 hours, then drain the syrup, reboil at 20° and pour back into the jars. Continue this operation every two days, increasing the strength each time until 24° is reached. Leave three days, then put in cans or jars, covering with 25° syrup, seal and process.

Quart cans,	10	minutes	in	boiling	water.
Pint	"	6	"	"	"
Quart jars,	5	"	"	"	"
Pint	"	3	"	"	"

NUTS IN SYRUP.

Take unripe nuts. The outside shell must be soft so that a needle may pierce it easily. Peel them with a knife making heavy flat peels, throw them in cold water containing one ounce sulphite of soda to each three gallons of water. The water will turn perfectly black. Change the water several times, using the same quality of sulphite of soda. When the water has become considerably clearer, place the nuts in a kettle, add water containing one ounce sulphite of soda to each four gallons of water, and boil. After five minutes, drain the water off and cover with fresh water containing same quantity of sulphite.

Continue this operation until you have perfectly white nuts. If they are still too dark and have been softened by the subsequent blanching, it would injure the nuts to boil them further. Finish the blanching by leaving the nuts in a very strong cold solution of sulphite, say one ounce for each gallon. When white rinse several times in clear water, place in stone jars and pour over hot syrup of 18° Beaume to which has been added one ounce sulphite to each six gallons of syrup. Leave stand for 24 hours, then drain, reboil the syrup at 20° and pour over the nuts. Continue this operation every two days, increasing the strength of the syrup 1° each time until 25° is reached. Can or bottle and cover with hot sugar syrup at 20°. Seal and process.

Quart cans,	9	minutes	in	boiling	water.
Pint	"	5	"	"	"
Quart jars,	4	"	"	"	"
Pint	"	2	"	"	"

MEDLARS IN SYRUP.

This fruit is used but little in the United States and is known as German Medlar. It has very little flavor and is used as a change when tired of other fruits.

Pierce the medlars several times with a copper needle from stem to bottom and throw in water containing one ounce alum to four gallons water. Leave one hour, then rinse and blanch in water containing one ounce sulphite of soda to each five gallons of water. Boil slowly until softened, refresh in cold, running water, allow to dry for one hour and put in stone jars. Cover with hot, boiling syrup at 20° Beaume, leave stand over night, drain, reboil the syrup at 25°, and pour again over fruit. Twenty-four hours later drain, put in cans or bottles and dip with boiling syrup at 22°. Seal and process.

Quart cans,	10	minutes	in	boiling	water.
Pint	"	6	"	"	"
Quart jars,	5	"	"	"	"
Pint	"	3	"	"	"

It is advisable to improve the appearance of the fruit by coloring the last 25° syrup with "orange" aniline color.

LIMES IN SYRUP.

Green or yellow limes are imported in the United States in salt water brine (10 to 12 per cent. salt).

Wash them in cold, running water for two hours and blanch them thoroughly; as their skin is hard, boiling will not damage the fruits. Drain and reboil for a few minutes in water to which add the coloring, green if you prepare unripe fruit, light yellow, orange or red if you handle ripe fruits, which are nearly white. Cool in cold water.

Put the fruit in stone jars, cover with hot syrup at 18° Beaume, drain every day, reboiling the syrup and increasing its strength one degree each time until 24° is reached, then drain only every two days until 26°. Put in cans or jars and cover with hot syrup at 26°. Seal and process.

Quart cans,	19	minutes	in	boiling	water.
Pint	"	7	"	"	"
Quart jars,	8	"	"	"	"
Pint	"	6	"	"	"

CANDIED FRUITS.

Fruits to be candied must not have reached maturity; otherwise no good result can be expected.

If the fruits are to be pitted, this has to be done first; if they are to be peeled, do so, throwing the fruits in light sulphite of soda water to prevent them from turning black on account of the contact with the steel of the knife and the oxydizing action of the air.

All the fruits have to be "bleached" in the sulphur room for about six hours, with exception for the peels (orange, lemon, etc.), to which we will add the melons, for which this operation is dispensed with.

BLEACHING.

The fruits are to be bleached as soon as they reach the factory; they can be pitted after the bleaching is done. The bleaching will thoroughly disinfect, stop the fermentation and prevent the fruit from spoiling. From the sulphur room place

them directly in buckets of cold water, put as many fruits as you can in each bucket with just enough water to cover them all. This water will soon be saturated with the sulphur fumes which had penetrated the fruit, and be sterilized. If the buckets are in a cool place, you can without fear leave the fruits there for four or five days. They will not decay or mature any further.

PRICKING OF CANDIED FRUITS.

I have stated before that the skin of the cherries, green-gages, etc., burst when they are put in the syrup, and I have explained how this is avoided by pricking them with copper needles or pins. This should be done for the fruits you wish to candy. It is preferable it should be made before the bleaching; however, it is often done after. In this case, throw the fruits in sulphite water, one ounce sulphite of soda to six gallons of water, as soon as they are pricked. (See "Pricking of the fruits.")

If the fruits are pears, figs, medlars or of similar nature, it is necessary that, with a larger copper pin, they should be pierced several times right through the heart and at least twice lengthwise from stem to top; this is in order to facilitate the blanching, and afterwards the syrup to penetrate the fruits.

BLANCHING.

The fruits are then "blanched." Place them in medium warm water and heat slowly until it reaches boiling; this softens the fruits, and they rise to the surface of the water. Pick them up either with a skimmer or a confectioners' fork with very long, flat teeth, lay them to cool off in cold, running water, or if they are too soft, in light alum water (one ounce to eight gallons); it can be increased after this, one ounce to four gallons.

If the fruits were not thoroughly bleached by the sulphur fumes, you can add a little sulphite of soda to the "blanching water."

When they are thoroughly cooled, place the fruits to dry for one hour on white willow trays or hurdles.

CANDYING.

Lay your fruits gently in earthenware or stone jars, pour over hot syrup, marking from 14° to 20° Beaume, drain after six

to twelve hours, reboil the syrup, adding sugar or glucose in order to reach two degrees more. After this every three days drain, reboil your syrup, always increasing its strength a little until it reaches 33°.

The fruits by this time ought to be candied, clear and firm. Be especially careful not to use too hot syrup for the first sugar bath and always give the fruit time to absorb the sugar. Syrup below 27° penetrates easily in the fruit, if stronger it requires more time, and if the fruits are not already well filled with sugar at low strength, pouring over heavy syrup would cause them to harden and to shrink.

When the syrup reaches 33°, and that, after a few days of contact with the fruit, you find that its strength has not decreased, it shows that the fruits are not absorbing sugar any more, they are saturated. At this stage you can rest; leave the fruits in the syrup as long as you may desire, days, weeks or months. They will not spoil, provided they are kept in a cool and dark place.

Should you at this time or at any period during the preparation find foam or mold on the top of the jars, it would be a sign of fermentation, you must check its progress at once. Drain the syrup, bring it to boil, pour hot over the fruits; repeat the operation once more 30 minutes later.

The sugar at 33° is liable to take in a lump or to candy. To avoid this add to your syrup when it reaches 32° a tablespoonful of acetic acid per gallon of syrup; in addition we recommend also a spoonful of glucose.

CANDYING IN GLUCOSE.

The fruits can be candied in pure sugar syrup or glucose syrup. The former preserves better the flavor of the fruit, but fruits candied in glucose are transparent, retain their original shape and look and sell better.

With glucose there is no danger of the syrup taking in lump, there is much less fermentation, and at any rate I would advise for practical work to use at least 1-3 of glucose.

COLORING FRUITS.

All the white fruit can be made green, pink, red or golden yellow by merely adding the color to the water when blanching; however, for many, such as medlars, pears and cherries, much better result is obtained in adding the color to the syrup when it reaches 27 or 28° Beaume, when near the end of the sugar absorption process.

ESPECIAL STONE JARS FOR CANDYING.

By handling the fruits you destroy their shape and hurt them more or less. By using jars made for the purpose you will avoid the loss, as all the torn fruits can only be used for jams, and all the labor and time spent on them is wasted; therefore, it will pay to have the proper jars.

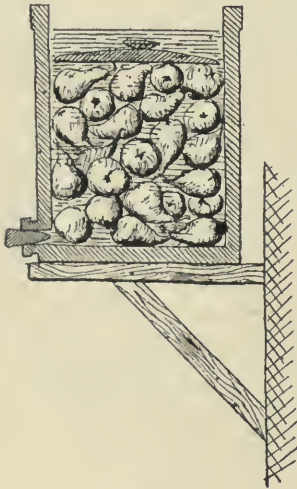


FIG. 3

They should hold two to three gallons and be cylindrical, with an opening on the side, level with the bottom; this will allow you to drain the syrup without disturbing the fruits. This opening should be closed with a cork or, better, with a piece of wood. The fruits have a tendency to raise to the surface; this would cause fermentation. Keep them down by placing on them a perforated cover also of earthenware; this cover, being of smaller diameter than the opening of the jar, will enter and rest on the fruits. By its weight it will keep them under the level of the syrup. 3.)

Should your hot syrup be poured over the fruits it would damage them; being very heavy it would tear those on the top which would receive the first shock. Here will the cover again prove its usefulness. The syrup will strike it, and will cover the fruits without causing any damage.

The jars should be covered with a cover having near its centre a hole of one inch in diameter to allow the circulation of air, this cover should be made of wood or cardboard and is never to be placed on jars before they and their contents are cold.

The work should be done in a cool place. A basement is the most appropriate, and the stone jars should be kept in as dark a place as possible, the daylight discoloring the fruit; this is also the best means to keep away from the flies and bees; they are very disagreeable and undesirable hosts.

FRUITS IN BRANDY WITH CANDIED FRUITS.

Now that you have a stock of candied fruits you can, at pleasure, turn them into the highest grade of preserves by merely bottling them, covering them with syrup and processing, or make the highest grade of fruits in brandy by bottling and covering with

Four quarts proof spirit,
One quart 32° syrup,

and sealing airtightly. Or make crystalized or glace fruits.

1° CRYSTALIZED FRUITS.

Drain your syrup from the stone jars, reboil it between 34 and 35°, pour over the fruits; four days later drain. The syrup is heavy, and it will be a slow operation. Reboil it at 36° and pour over the fruits again. Six days later your fruits are ready to be dried. Drain the syrup, take the fruits out one by one, washing them gently with a sponge and a little fresh water, lay them side by side, their best side up, on silver plated or tinned copper-wire trays. Take them to dry in the hot room which is kept at a temperature from 70° to 80° Fahrenheit. The outer surface of the fruit must be thoroughly dried, in fact they must not stick to the fingers if touched with dry hands.

The small fruit as cherries, gages, etc. are not washed with the sponge, simply drain the syrup, add water and boil it, reducing its strength to about 10° Beaume. Pour over the fruits while hot and leave not over three minutes, stirring with a wooden spoon, drain and place the fruits on the wire or hair sieve to dry in the hot room for about forty-eight hours.

When the fruits are perfectly dry, they are placed in the crystalization boxes, one next to the other if they are pears,

melon slices etc., and two or even three layers in thickness if they are small fruits such as cherries.

To prepare the crystalization syrup you must use the best sugar you can obtain, bright lump sugar gives good result while the dull mat sugar gives a poor crystalization. Dissolve eight pounds of sugar per gallon of cold water, stirring once in a while, when dissolved place on fire and heat until it marks 33° Beaume when boiling. Should any greasy spots appear on the surface, remove them with a wet sponge. As soon as 33° is reached remove the kettle from the fire and place it in a bucket of cold water as near as possible to the table on which are the crystalization boxes containing the fruits.

Do not stir or disturb the kettle in any way; it might cause the sugar to take in a lump.

Cover your fruits with a wire screen so as to prevent them to float when you will cover them with syrup. When your kettle is cold take it gently by its handles and pour its contents over the fruits in the crystalization boxes. Leave them undisturbed; it will take from six to twelve hours for the crystals to form and surround the fruits. When you judge the crystals to be of proper size, you incline the boxes allowing the syrup to drain. It requires about six hours to drain all the syrup of the tray. Leave the fruits in the crystalization boxes over night to dry the crystals, and only take the fruits out when there is no moisture left.

The whole operation has to be made very carefully but it is done easily after a little practice. The main points are:

1. The fruits must be perfectly dry when placed in the crystalization boxes, otherwise they will not crystalize.
2. Not to disturb the crystalization syrup as it is liable to take in a lump in either the kettle or the crystalization boxes. It would in the latter case be the cause of great annoyance.

GLACE FRUITS.

Instead of being crystalized, the fruits as they come out dry from the hot room, can be glazed in sugar. They are then known as "Glaze fruits."

Dissolve and boil in a small kettle sugar and water, skim and boil until, after plunging the skimmer in the syrup and blowing on it, the syrup will form air bulbs on the back of the holes perforated in the skimmer. At this time pour a small quantity of the fruits in the kettle, boil one minute longer, and remove the kettle from fire. Without losing any time, start taking the fruits out one by one with a long toothed fork and lay them side by side on a tinned wire tray or sieve to allow the excess of sugar to drip. Take these trays in the hot room until entirely dry.

During this preparation you must use special care:

1. That your fruits be first very dry.
2. Work a small batch at the time.
3. Do not handle the fruits with your fingers, but with the long toothed fork.
4. Always lay your fruits to dry on the wire trays best or nicest side up.

5. Do not dry too quickly in the hot room; the coating would turn white. It must remain colorless as its object is not only to help preserving the fruit but also to give it a "glace" making its color appear brighter. This sugar coating must improve the appearance of the fruit, not spoil it.

THE USE OF SUGAR AND GLUCOSE IN CONNECTION WITH FRUIT FROM A CHEMICAL POINT OF VIEW.

During all the previous preparations in which we have used sugar syrup, you have noted that for preparing candied fruits pure sugar could be used, cane or beet sugar are alike; a hot solution of them at 33° Beaume crystalizes or takes in a lump. As to completely saturate the fruits of sugar, stronger solutions ranging from 33° to 36° Beaume must be used, it is necessary to add to the syrup (when it reaches 32°) a certain quantity of acid. This acid will transform the crystalizable sugar of which the chemical formula is $C_{12}H_{22}O_{11}$ in uncrystalizable sugar which formula is $C_{12}H_{12}O_{12}$.

For this we have added a small proportion of acetic acid and a part only of the sugar has been transformed. Instead of doing this, the same result would have been obtained by increasing

the strength of the syrup by adding glucose instead of sugar. The glucose has the same formula as the interverted sugar (uncrystalizable) $C_{12} H_{12} O_{12} + 2 HO$.

I have recommended the use of glucose because the candied fruits saturated by it are harder, of brighter color and have more transparency. It is often claimed that it spoils the flavor of the fruit. This may be if you use glucose with a sulphur taste. The glace fruits are also too sweet, the natural flavor of the fruit can hardly pierce through the excess of sweetness. If you use glucose, the flavor of the fruit has a better chance to show as the glucose is much less sweet than the sugar. It requires $2\frac{1}{2}$ parts of glucose to sweeten as much as one part of cane sugar.

The sugar contained in the fruits, grapes etc. is noncrystalizable and chemically is glucose. Practically no chemist will be able to state whether the fruits have been candied in syrup or glucose. He can prove that the analyzed fruit contains such a percentage of crystalizable sugar and such a percentage of uncrystalizable sugar, but whether this uncrystalizable sugar is crystalizable sugar which we have "interverted" by addition of acid or if it is glucose, that he cannot specify.

Should the chemist find traces of sulphuric acid, he will deduct that this uncrystalizable sugar is commercial glucose because the commercial glucose is produced by the action of acids on fecula and starch, and that the acid used for the purpose is the "sulphuric." But, if instead of ascetic acid we had added to our 32° syrup a few drops of sulphuric acid, we would have "interverted" our sugar. We would have glucose now, but pure sugar just the same.

CANDIED PEARS.

It is difficult to obtain the right kind of fruits for this work. Most of the pears are too large. This is probably the main reason why candied pears are imported from France where the manufacturers have on hand several varieties just suitable for this work. These also offering the advantage of successive maturity, some ripening in August successively down to the end of October.

The most popular sort is known as "Poire Anglaise" or "Poire d'Angleterre" the "Cramoisine" being next. The "Rousset" being the lower grade. However, all small pears with hard flesh can be candied.

Take unripe fruit, bleach for at least six hours in the sulphur closet, then throw them in cold water. You may leave them in this water several days without danger of spoiling. Regular peeling machines are used, scrape the stem and stick several times the long copper needle through the fruit from the eye to the stem, piercing the core, place them in the basket of the blanching kettle filled with water containing one ounce of sulphite of soda to four gallons of water. Heat slowly and bring to a light boil, maintain until the pears are softened and a needle can easily pierce them through the core. Pick the white pears with the skimmer or a large flat fork, putting them in a cold water tank to cool off. After one or two hours in cold water, place the fruits in earthenware jars and pour over hot syrup (at 20° Beaume boiling) to which has been added one ounce of sulphite of soda to each five gallons of syrup, six to twelve hours later drain, reboil increasing the syrup to 22°, pour over. Increase two degrees every two days but by addition of glucose instead of sugar and after 28° is reached, drain and reboil only every three days, increasing each time one degree until 33° is reached, when the pears should be thoroughly candied, be milk white and transparent.

PINK PEARS.

They can be colored pink by addition of carmine or aniline color when the syrup reaches 28°

GLACE PEARS.

Glace pears see "glace fruits."

CANDIED QUINCE.

BLANCHING.

CANDYING.

This is a rather difficult fruit to candy on account of its tendency to transform the syrup into a solid jelly and also on

account of its turning easily dark brown if the syrup used is a little too hot.

Peel, slice and core the quinces, throw them into cold water to which one ounce of sulphite of soda has been added to each six gallons of water. Dry for one hour on trays and bleach in sulphur room over night. Blanch in the previous cold water bath or a similar one, heating slowly until boiling is reached, but it must not boil.

Place the quinces in earthenware jars and pour over lukewarm syrup at 20° Beaume. Twenty-four hours later, drain, reboil syrup at 22° and pour over again. Repeat the operation every three days until 32° is reached, then the quinces are candied. Should the syrup be hot in any of the operation, which is made increasing each time the strength of the syrup of two degrees, the quinces would turn of dark color. It would also cause the whole to take into a solid jelly.

CRYSTALIZED QUINCE.

See crystalized fruits.

GLACE QUINCE.

See glace fruits.

CANDIED CHERRIES.

BLEACHING, CANDYING, COLORING.

“Bigarreaux” cherries are the best. They must not be ripe. Bleach the cherries over night in sulphur fumes. In case of “rush” five hours will be enough provided the layer of fruit on the white willow hurdles is not over two inches. They must be perfectly white when taken out of the sulphur closet. It is necessary that this operation be made in the shortest time possible after the fruit has been picked. If they have been long in the baskets or boxes, they will show dark spots which will later turn black. Such fruits should only be used for pulp, jams etc.

The vapor of sulphur has destroyed all the ferments which were on the skin of the fruit, therefore if the cherries are immediately put up in wooden buckets or barrels, covered

with fresh water, they will keep for several days without decaying or ripening further. One ounce of sulphite of soda should be added to each thirty quarts of water; this would insure the most perfect keeping by sterilizing the water. This applies to all varieties of small fruits.

The cherries are pitted and blanched, thrown into cold running water where they may be allowed to stay from fifteen minutes to one hour. Then let the fruit dry out for a while in willow baskets or on hurdles. Then proceed with the candying.

Place the cherries in the earthenware jars and pour hot boiling syrup at 22° Beaume (when boiling) over them, leave one hour, then drain the syrup, boil to 24° and pour over the cherries. Leave twenty-four hours, drain the syrup, add sugar and boil bringing to 25°, pour over the cherries. Repeat the operation three times more every second day. The strength of the syrup is then to be increased to 27°. Three days later, drain, and increase to 28°. Three days later increase to 30° adding to the syrup a small quantity of carmine to color the cherries red. The carmine will give a soft and even color to the fruit, and aniline colors must not be used; they color the flesh darker than they do the skin, thus giving a disagreeable appearance to the part of the cherry where the pit is taken out, besides the aniline color fades by the action of the light. It would spoil quickly the natural and pleasant look of the candied fruit.

Resume the draining four days later, boiling the syrup at 32° by addition of glucose instead of sugar. Repeat this operation twice. At the next boiling increase the strength of the syrup to 33° by adding some more glucose.

This operation is to be repeated until the syrup is found to remain at 33° after four days of contact with the fruit. This will show that they have absorbed all the sugar they possibly could. The cherries must then be very transparent, be full and of light color.

The cherries are kept in the stone jars until sale is made. They are delivered to the trade either "candied" simply dried up, "crystalized," or "glace."

CANDIED CHERRIES OR "MI SUCRE."

Increase the strength of the syrup progressively to 36° Beaume, dry the cherries in the hot room and pack in boxes.

CRYSTALIZED CHERRIES.

See crystalized fruit.

GLACE CHERRIES.

See glace fruits.

CANDIED GREENGAGES.

BLANCHING, CANDYING.

Take green, unripe fruits and treat them exactly as if for canning or bottling in syrup. Do not forget to add the few grains of "Emerald green" to the blanching water.

From the last cold water bath place them on willow trays or hurdles allowing them to dry for one hour. Put them in the earthenware jars and pour over hot sugar syrup making 25° Beaume when boiling. Eight hours later drain, reboil the syrup and increase its strength one degree Beaume by the addition of glucose. The syrup must always be poured gently over these fruits and never too hot. The gages would break or fall to pieces. Remember the flesh has nothing to hold it as the skin has bursted and curled during the first part of the process. When 33° is reached the gages are candied. They should have kept their shape, be firm and of good natural green.

Do not attempt to candy this fruit with pure sugar syrup only. It would cause you trouble as it ferments much easier than when glucose is employed. Besides, the glucose will not effect the flavor as the stone and pit contain enough.

Store them in stone jars.

GLACE GAGES

See "glace fruits."

DRIED PLUMS.

All the varieties of plums are to be treated same as the greengages.

CANDIED PEACHES.

BLANCHING, CANDYING.

These fruits being watery do not keep a fragrant flavor when saturated with sugar and therefore meet with limited demand.

Take firm fruits, peel them, throw in cold water to which a small quantity of potash has been added, this to keep them from turning black on account of the contact of the knife while peeling. Put in kettle containing hot water, bring to slow boiling, cool off in cold running water, picking the fruits with a skimmer.

Put in stone jars and pour over hot syrup making 25° Beaume when boiling and to which has been added one ounce of sulphite of soda to each six gallons of syrup. Twelve hours later, drain, reboiling the syrup and add sugar to bring back to 25°. Repeat the operation each two days until it reaches 29°, then each three days until 33° increasing each time one degree but from 28° up increase by addition of glucose instead of sugar.

The peaches are then stored in stone jars.

The peaches can be colored red by addition of aniline raspberry red, to the hot water bath when blanching, or green. In this case take very green unripe fruits.

GLACE PEACHES.

See "glace fruits."

CANDIED APRICOTS.

BLEACHING, BLANCHING, CANDYING.

Pit the fruit which must be nearly ripe, slightly yellow. Bleach in sulphur closet over night, and wash them thoroughly in cold running water (or in a bucket of water containing one half ounce of alum to each twelve gallons water). Prick with copper needles and put in medium hot water. They will go to the bottom. Heat gradually, and as it reaches boiling, the apricots will slowly come to the surface. Pick them gently one by one with the skimmer and place them in

cold water containing one half ounce of alum for each twelve gallons of water. Then strain the water, put in the earthenware jars, and cover over with the regular hot syrup marking 25° Beaume to which has been added one ounce of sulphite of soda to each six gallons of syrup. Twenty-four hours after, drain the syrup, reboil adding necessary quantity of sugar to reach 25° and pour boiling over the fruit. Repeat the operation every two days until you reach 28° and then every three until 33°. The apricots are then candied. They must be clear and transparent, be of light and even color. The addition of the sulphite will greatly help to obtain this.

The fruits can then be stored in the stone jars until "Crystallized" or "Glacé." Before doing either of these the apricots must be taken each separately, washed with the hands in water and dried in the hot room maintained at about 80° Fahrenheit. They must be thoroughly dried.

CRYSTALIZED AND GLACÉ APRICOTS.

(See crystallized and glacé fruits.)

CANDIED STRAWBERRIES.

To obtain fine-shaped, transparent candied strawberries all lies in the skill of the confectioner. The skill is only acquired by practical work and constant attention, this fruit being the most delicate of all.

I will recommend two different formulas.

Bleach the berries in the sulphur room, rinse in cold alum water and allow to dry for one hour. Put the berries on silver-coated wire trays, place then the trays one over the other in an enameled iron kettle or earthenware jar, pour over cold syrup at 28°, leave twenty-four hours, drain and replace with new syrup of same strength, leaving for twenty-four hours more. Drain, reduce the syrup by addition of water to 18° Beaume, allowing to partially cool off and pour over the fruit when slightly warm. Six hours later, before leaving for the night, drain and replace with syrup at 19°. Each twelve hours replace with syrup a degree stronger, always pouring it warm and not hot until 24°.

is reached, then leave twenty-four hours between each operation until 28°, then take 30° syrup, leave three days and 32° after. The berries must then be full of sugar and transparent, if not sufficiently firm the syrup is to be drained, reboiled at a greater degree and poured over again. The syrup of the last operation is to be colored red if this color of fruit is desired. The syrup used should be mostly glucose.

The berries are then ready to be transformed into

WIESBADEN COMPOTE.

(See strawberries in syrup.)

CRYSTALIZED STRAWBERRIES.

(See crystalized fruits.)

GLACE STRAWBERRIES.

(See glace fruits.)

The other process is the following:

Place the berries in the earthenware jars and pour over 19° syrup warm, not hot, to which has been added one ounce of sulphite of soda to each three gallons of syrup and follow the same range of increased strength as described here above.

The berries employed must be fresh picked and firm. Should they have a tendency to soften, increase the strength of the syrup, should they shrink and turn hard and coarse, the strength of the syrup must be reduced. Should white mould appear on the syrup, drain and reboil it at once, repeating the operation twice during the time named for one operation. The jars should be kept in a dark place during the whole process.

CANDIED PINEAPPLE.

BLEACHING, CANDYING.

Peel and slice one-half inch thick. Bleach sixteen hours in the sulphur closet, wash in cold water. If you have a large quantity of apples you can leave them in this water for two days without injury to the fruit. Put in stone jars and pour over hot boiling syrup at 16° Beaume. Twenty-four hours later drain,

reboil the syrup at 18°, pour over. Repeat the operation every two days until 28° is reached. The Pineapple is one of the easiest fruits to candy as it does not ferment easily. Leave them in the jars, give them time to absorb the sugar, increasing the strength of the syrup progressively until 36°. To candy, pour the contents of your jars in the kettle, heat slowly to melt the syrup, wash gently each slice with a sponge and cold water. Dry in the hot room until the outer surface is perfectly dry.

GLACE PINEAPPLE.

(See Glace fruits.)

CANDIED BANANAS.

Peel by hand the bananas, not using any knives or metal, and dip them for one hour in cold water to which has been added one ounce of alum and one-quarter ounce of sulphite of soda per gallon of water. Lay the bananas on white willow trays or hurdles and sulphur them for three hours. Owing to the softness of this fruit it is not advisable to leave them in the sulphur closet over night.

Put in stone jars and pour over lukewarm syrup at 25° Beaume. After twelve hours, drain, reboil at 26°, pour over. After this increase one degree only and drain every three days until 36° is reached. For the last operations increase the temperature of the syrup from lukewarm to hot.

If the bananas are not of satisfactory color, then add some "gold yellow" aniline color to the syrup, boiling it and pouring over the fruits.

CANDIED FIGS.

Prepare them exactly as described for "Figs in Syrup," but from 26° syrup, drain every four days, increasing its strength 2° Beaume each time until 35° is reached.

GLACE FIGS.

(See Glace fruits.)

CANDIED MELONS.

WHOLE MELONS. SLICED MELONS.

The process is the same as for "Melons in Syrup," but after you have used the 25° syrup, continue the operation until 35° syrup is reached, draining and reboiling the syrup every four days.

Whole melons are to be treated in the same way. If you would take the melon just as it grows, the sugar would never be able to penetrate the inside, therefore the melon laying flat on the table and holding a pointed knife perfectly perpendicular, cut through the skin and flesh a circular hole, having the stem as centre and of the diameter of a table spoon. This will act as a cork which you will be able to place back later. Do the same on the bottom and with a spoon take out the seeds.

The whole melon is then blanched and put in syrup, etc., same as for the slices, and at the same time treat the top and bottom which you will use to close up the top and bottom holes. If the stem of the melon has one or two small leaves you may leave them on, they will be candied with the melon.

Of course during the whole process the melon is to lay flat so as to enable the syrup to go through the centre. Do not forget that you must never pour over melons boiling hot syrup, it would soften them too much, pour it warm.

GLACE MELONS.

(See Glace fruits.)

CANDIED WATERMELONS.

Watermelon peels are candied same as melons.

CANDIED ANGELICA.

BLANCHING, CANDYING.

Blanch the sticks in plain boiling water adding "Emerald Green" to maintain a bright green color. Cool off in cold running water.

Place the sticks standing one next to the other in a stone jar of proper height or an especially made high tin can if your jars are too short.

Pour over hot boiling syrup at 22° Beaume, drain three hours later, reboil at 23° and pour over again. Twelve hours later drain and reboil the syrup at 24°. Repeat the operation four times, once every three days until 26° is reached. Then every five days increasing 2° each time until 35° is reached. If you desire perfectly round sticks, they may be obtained by sliding the small ones into the larger after the blanching and taking them out after the sugar process is over.

GLACE ANGELICA.

Increase the strength of syrup progressively to 36° and finish same as "glace fruits."

CANDIED CHESTNUTS.

The kind used is imported from Europe and known as "Lyons" or "Torino" marrons.

The skill lies in keeping them whole and of light, clear, chestnut color. They are soft and brittle and should be handled with greatest care. With the point of a knife, make a semi-circle cut in the bottom of each chestnut, the cut going from one end to the other of the broadest side. The outer skin only should be cut, if you cut deeper it would cut the inside peel and the water would be in direct contact with the chestnut and it would soften it too much on that part of the fruit. Lay them in the basket of the kettle, cover with water and boil slowly until the water is quite brown, drain and cover with clear, hot boiling water, boil and change the water as often as the water is dark brown. It must be a very slow boiling, this is to say the water is to be kept between 208° and 212° all the time. It must not disturb the chestnuts as it would break them. After six hours, take the chestnuts out, peel them and place on a flat bottom in the copper kettle. The flat bottom is generally a perforated tinned sheet iron. Cover with hot syrup at 24° Beaume to which add one ounce sulphite of soda to each six gallons of syrup, turn the steam and keep them hot, not boiling, until night. Do not disturb

them, but next morning early resume the heating, maintaining all day, only adding once in a while some more, but stronger syrup. Continue the operation as late at night as possible, leaving it only to start the next morning at as early an hour as you can. When in the evening, if your syrup is over 34° Beaume, take some of the chestnuts and ascertain if they are thoroughly candied; if they are, let them cool off in the syrup; if they are not, continue heating as late as possible; resume the next morning until thoroughly candied. It will take in the whole about forty hours exclusive of the time at night when it was not heated.

When cold take them out of the syrup, one or two at a time, lay them on tinned wire trays to dry for two days. The syrup is to be at least two thirds glucose during the whole operation and should be flavored with a few vanilla beans or vanillin.

GLACE MARROW OR CHESTNUTS.

See "glace fruits."

CANDIED GREEN ALMONDS.

Heat exactly same as for almonds in syrup, but after 24° Beaume syrup has been reached, drain and reboil every four days until 33° is reached. Do not hasten, give the almonds time to absorb sugar.

GLACE ALMONDS.

See "Glace fruits."

CANDIED NUTS.

Treat exactly same as for nuts in syrup, but after the syrup has reached 25° Beaume, drain only every four days and reboil each time, increasing the strength of one degree Beaume. At 33° the nuts are candied.

GLACE NUTS.

See "glace fruits."

CANDIED MEDLARS.

Treat exactly as the "Medlars in syrup," but from 25° syrup, drain every four days, increasing the strength of the syrup two degrees Beaume each time, until 33° is reached. Give them time to absorb the syrup. At the last operation color the syrup with "Orange" color.

GLACE MEDLARS.

See "glace fruits."

CANDIED ORANGE PEELS.

SALTED OR FRESH PEELS.

If you use imported peels (in salt water 10 per cent.) wash them in clear water for two hours. This not necessary if you use fresh peels.

Blanch the peels thoroughly, boiling them on slow fire in water until they are all well softened, otherwise they will not take the sugar. Put in stone jars and cover with hot syrup at 22° containing one ounce of sulphite of soda to each four gallons of syrup, drain a few hours later, reboil at same degree and pour over.

Drain every day and reboil one degree higher until 24° is reached. Drain them and reboil every three days, repeating this operation six times, increasing gradually the strength, but not going over 26° degrees for the last. Then every eight days drain; reboil two degrees higher until 33° is reached. You should not go over this strength.

Put as many peels in the jars as you can and keep them down with a disk of stoneware with holes as a sieve to let the syrup pass through the whole surface.

CANDIED WHOLE ORANGES.

Treat them same way as the peels, but in order to allow the sugar to go in the inside, cut a round disc on top, this top will be candied at the same time as the orange and will be used to close the hole after the process is over. Bleach them as long as possible. The large copper needle must go through the skin and

fruit easily. It takes two hours in cold water to cool them inside, two hours standing upside down to drain all the water out, then put in sugar same as the peels.

GLACE WHOLE ORANGES.

See "glace fruits."

CANDIED CITRONS.

WHOLE AND SLICED CITRONS.

These are shipped to the United States in salt brine at 10 to 12 per cent. Wash the slices in running water to remove all the salt and blanch them in plain water, adding a little "Emerald Green" to give them a light bright color. Keep near the boiling point, but do not actually boil, this breaks the fruit and separates the pulp from the skin. After they are softened, cool in cold running water for six hours at least, it will dissolve all the bitter contained in the fruit.

Put in stone jars and pour over hot syrup at 14° Beaume, drain and reboil every two days, increasing the strength each time until 28° is reached, then leave three days between each draining until 33° is reached.

If you desire whole citrons, treat them in the same way, but cut a round hole at each end, same as explained for the "Whole Melon" and take the seeds out with a spoon. Save the pieces cut off of the top and bottom, blanch and put in sugar, you will use them to close up the fruit after the process is over.

Green and ripe citrons are used and treated as above. If you have ripe ones they are yellow, but you can color them green. If you prefer them yellow, they will be improved by the addition of "Orange" aniline color to the water when blanching.

GLACE CITRONS.

See "glace fruits."

CANDIED MANDARINES.

This fruit is easily candied and is to be treated the same as the "Whole Oranges" but as the skin of the mandarine is much

thinner than that of the orange, do not cut a hole in the top of it; merely prick it several times with the large copper needle and each time piercing through the whole fruit.

GLACE MANDARINES.

Finish same as glaze whole oranges.

CANDIED LEMON PEELS.

CANDIED WHOLE LEMONS.

These are imported from Sicily. They are treated same as "Candied Orange Peels" which we refer you to. Same for "Candied Whole Oranges," see "Candied Whole Oranges."

CANDIED LIMES.

Prepare in the same way as the "Limes in Syrup," but it is preferable you should prick every fruit with the copper needle as to enable the sugar to penetrate easier. Drain and reboil the syrup four times at 26° four days between each drainage, then raise two degrees each four days until 33° Beaume is reached.

GLACE LIMES.

See "Glaze fruits."

SUGAR AND GLUCOSE SYRUP.

AEROMETER BEAUME.

BRIX PERCENTAGE SCALE.

The strength of the sugar syrup is measured in degrees, aerometers and densimeters of various kinds have been made for the purpose, the most generally universally used has been invented by Beaume." Its principle is wrong; however, as long as it is in general use, we will refer to it when indicating the

strength of syrups in their various applications in the preserving line.

In the "Percentage" aerometer, also known as "Brix" from its constructor, each degree corresponds to one per cent. of sugar, the liquids being measured at $+17.5^{\circ}$ centigrade or 62.6° Fahrenheit; This is to say a syrup which, at the temperature of 62.6° Fahrenheit, would mark 17° of strength, would contain 17 parts of sugar and 83 parts of water.

The principle on which the aerometer Beaume being altogether different, it is regulated on the density of distilled water at 15° centigrade ($+59^{\circ}$ Fahrenheit) this marking 0 Beaume, each degree corresponding to one per cent. of salt. That is to say, that placed in salt water at $+59^{\circ}$ Fahrenheit, the aerometer marking 12 degrees will indicate that this water contains 12 parts of salt and 88 parts of water (12 per cent. of common salt).

The aerometer Beaume is all right for salt water, but for sugar water "Brix" aerometer ought to be used.

The following tables will illustrate the above.

Solubility of sugar in water from 0 to 50 degrees Centigrade or from 32 to 122 degrees Fahrenheit.

—Temperature.—		Percentage of Sugar Contained in The Saturated Solution.
degrees Centigrade	degrees Fahrenheit	
0	32	65
5	41	65.2
10	50	65.6
15	59	66.1
20	68	67
25	77	68.2
30	86	69.8
35	95	72.4
40	104	75.8
45	113	79.2
50	122	82.7

COMPARATIVE TABLE OF BRIX AND BEAUME DEGREES.

Comparative table of the Beaume and Percentage of Brix degrees with the corresponding density.

Brix	Beaume	Density	Per cent. sugar	Per cent. water	Total.
0	0.	1.	—	100	100
2	1.11	1.0078	2	98	100
6	3.34	1.0237	6	94	100
10	5.56	1.0401	10	90	100
14	7.77	1.057	14	86	100
20	11.07	1.0833	20	80	100
24	13.26	1.1015	24	76	100
28	15.44	1.1201	28	72	100
34	18.69	1.1491	34	66	100
40	21.91	1.1794	40	60	100
45	24.56	1.2056	45	55	100
50	27.19	1.2328	50	50	100
60	32.36	1.2899	60	40	100
70	37.40	1.3509	70	30	100
80	42.29	1.4159	80	20	100
90	47.02	1.4849	90	10	100
100	51.26	1.5578	100	—	100

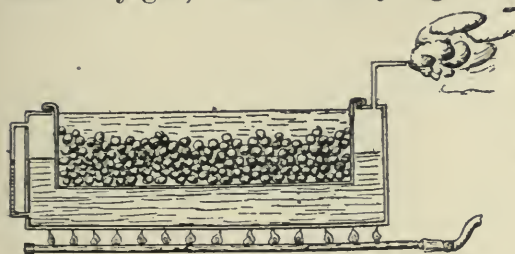
Good quality of lump sugar is clear white and dry, broken in the dark it should be phosphorescent. This accounts why powdered or pulverized sugar has a nasty taste like burning.

Under the influence of heat, it attacks iron; this is the reason why kettles of this metal should not be used in connection with preserves or syrup. Sugar is without action on copper, tin, lead and zinc.

QUICK PROCESS OF CANDYING FRUITS AND PEELS.

Candyng fruits, peels etc. can be made in a more modern way; the handling of stone jars, the draining of heavy syrups are slow operations.

To candy cherries, apricots, gages in four days' time, the fruits, as soon as they are blanched, should be placed in a large, square copper tank, one foot deep, placed in a water bain-marie, heated by gas, so as to easily regulate the fire. Cover the fruits



with cold 12° Beaume syrup; heat slowly, adding from time to time some hot boiling syrup, to take place of the evaporation and in the meantime increase the strength of the syrup.

At the end of the fourth day, if the syrup of the kettle marks 36°, your fruits are candied, must be transparent and full of sugar.

All the instructions given before referring to the addition of acetic or glucose also apply to this process.

It is of course understood that the given time of four days, which is right for the pears, cherries and apricots, will not suit all fruits. Always consider the nature of the fruit and the more or less facility with which it will be penetrated by the sugar.

If the fruits have a tendency to float in the syrup, a grating or tinned wire screen should be placed in the tank over the fruits. The tank itself should be of enameled iron to have the best results as the acid of the fruit will always to some extent attack the copper and this is liable to color the syrup and more or less effect the fruit.

If the manufacturer has possibilities to have the steam all night, he should have double bottom tanks or kettles. This would enable him to blanch in the same kettle without removing the fruits. They would be cooled with a stream of cold water in the same place.

ESPECIAL QUICK PROCESS FOR PEELS.

For the fruits which contain no acid as well as for the peels, a plain tank with drain faucet and a copper coil can be used. In this case the work would be directed as follows:

The peels are first blanched, then cooled off, covered with hot syrup at 14° Beaume. Twelve hours later drain, reboil at 17°,

cover the fruits again. Every twelve hours drain, and reboil until 23° is reached. Then the operation should be allowed to continue slowly all by itself, very slowly as it takes time for the peels to absorb sugar. Ten days after the blanching, the peels must be thoroughly candied, hard and transparent.

The same process will apply to all fruits, longer for some, shorter for others, keeping the proportion required by the stone jar process. The tanks are nothing but labor and time savers. The candied fruits are then crystalized or glazed by the regular process.

FRUITS IN BRANDY.

COMMON METHOD.

Fruits in brandy are prepared in different ways, but to the contrary of candied fruits, ripe fruits are required. The most common method being to place the fruits in glass jars or barrels, cover them with spirit at 60 per cent. (three parts double proof spirit and one part water). Leave six weeks, drain and cover with liquor as follows:

For better grade:

Three parts of drained spirit,
One part water,
One part cold sugar syrup at 32° Beaume.

For second grade:

Three parts drained spirit,
Two parts water,
One part cold sugar syrup at 32° Beaume.

This process gives especially good results with cherries. However the high class goods are prepared same as candied fruits. For these I refer the reader to the various special formulas given under the headings of the different fruits.

Whatever process is used, the goods are only marketable six weeks after the fruits have been covered with the liquor. It requires this time for the fruits to absorb the sugar and the spirit in the required proportion to render them palatable.

When green fruits are to be put up in brandy, they must be thoroughly blanched first.

PEARS IN BRANDY.

The "Beurre" and "Duchess" varieties are the best. Do not bleach them in the sulphur fumes, but peel, blanch and put in sugar same as for candied pears. When 29° is reached, bottle and cover with liquor.

Two parts double proof spirit,
One part cold 32° syrup.

Cover with paper, fasten with twine, leave for one week for the fruit to absorb part of the liquor, refill the jars and seal with Phoenix caps lined with water-proof corks.

A few grains of vanilin added to the liquor will add greatly to the flavor.

QUINCES IN BRANDY.

Peel the fruits placing them in water containing one ounce of alum to each six gallons of water. Then slice, core and put in glass jars and cover with proof spirit. After one hour, during which prepare a kettle of syrup at 25° Beaume and allow it to cool off, throw the sliced quinces in the said syrup and heat slowly until the quinces are softened. Pick the slices one by one placing them in a stone jar, boil your syrup until it reaches 28° and pour over the quinces. Leave thirty-six hours, then drain and bottle the fruits, covering with liquor made of:

Proof spirit in which the skins have infused, two parts, cold syrup at 28° one part. Cover with parchment paper, leave stand eight days, refill the jars with same liquor and seal air tightly.

CHERRIES IN BRANDY.

VARIOUS FLAVORINGS, THEIR PREPARATION.

There are several ways of preparing cherries in brandy. The best products being made as follows:

Take ripe, sour cherries, cutting the stems with scissors leaving about one half inch long to the fruit, prick them with

copper pins, throw them gently in medium hot alum water, and cool the cherries quickly in a cold running water bath.



Bottle for Fruits
in Brandy.

Place them in a stone jar, pour over them hot boiling syrup marking 15° Beaume. Twenty-four hours later drain the syrup. Place them in a barrel with liquor composed of:

Coriander distilled	spirit	3 parts,
Chinese cinnamon	"	2 "
Cloves	"	1 "
Double proof spirit		118 "
Water		76 "
		200 "

Five weeks later the cherries have absorbed all the spirit required. They are put in jars or bottles which are filled with liquor made as follows:

Previous infusion liquor	70 quarts,
Water	20 "
Sugar (crystalized)	35 pounds.

Add a few drops of carmine to color it pale pink. Seal jars airtightly.

The cherries will keep for years and retain their strength, quality and color. Of course the liquor can be flavored with other spices. A good formula is the following:
Stock flavor.

Infusion of vanilla beans	4 parts,
“ “ Ceylon cinnamon	2 “
“ “ cloves	1 “
“ “ peach and apricot pits	1 “

To infuse cherries:

Stock flavor	4 parts,
Double proof spirit	120 “
Water	76 “
	200 “

I have here above described the preparation of the highest class of brandied cherries. During the first part of the operation the fruit absorbs a certain quantity of sugar. This renders it firm and prevents it from being too easily penetrated by the spirit. But it is to be remembered that the cherries must be ripe. The sour cherries are the finest in flavor, but red bigarreaux or white cherries can be used. The liquor of the latter is always to be colored.

Low priced goods are prepared as follows:

Cut the stems at one half their length, prick with copper pins, throwing them in a bucket of cold alum water for one hour.

Put in barrels with spirit a few grains of vaniline and one per cent. of flavor composed of:

3	parts	distilled	spirit	of	coriander,
2	"	"	"	"	cinnamon,
1	"	"	"	"	cloves.

Six weeks later put in jars covering with liquor made as follows:

Previous infusion liquor	60 quarts,
Sugar	26 pounds,
Water	30 quarts.

and seal airtightly.

GREENGAGES IN BRANDY.

The most usual process is the following:

Take greengages which are not ripe and of dark green color. Cut the end of the stem leaving two-thirds of its length attached to the fruit, prick with the copper pins, wash in cold water and put in copper kettle with a large quantity of water to which has been added one ounce of common salt to each two gallons of water, heat slowly and as soon as it reaches 205° Fahrenheit, shut off the steam and remove the greengages gently with the aid of the skimmer to the cold water bath containing two ounces of alum to each six gallons of water. Remove them one hour later, and allow them to dry for another hour on white willow

trays or hurdles, put in earthenware jars and pour over hot sugar syrup at 26°. Drain a few hours later, reboil at same degree and pour over again.

Repeat the operation twenty-six hours later with syrup at 27° and once more at 28°. Drain and bottle, covering with liquor:

Proof spirit	5 quarts,
Water	2 “
Syrup at 32°	1 “
Vanila infusion, a few drachms.	

Vanillin can be used in place of vanilla.

In this process the contact of the fruit with the copper of the kettle in presence of salt will make the greengages remain green. For the benefit of the too scrupulous manufacturers, I will give the following receipt:

Prepare the fruit as described for the candied greengages, but use ripe fruit. After they have been in the various syrup baths up to 28°, remaining 24 hours in the latter, drain, bottle and cover them with liquor as given here above. Cover with paper, leave stand ten days that the gages will absorb all the liquor they can, refill with the liquor and seal airtightly.

All other plums are treated the same way omitting the green coloring if they are of the yellow or red variety.

PEACHES IN BRANDY.

On the market in three varieties, yellow, red and green.

1. “Yellow Peaches.”

Take medium ripe peaches, prick with the copper pins, wash in cold water and put in stone jars. Pour over hot syrup at 25°, drain after twelve hours, reboil at 26° leaving 3 days, then bottle covering with liquor:

Proof spirit	4 quarts,
sugar syrup at 32°	1 “

and color slightly with “Lemon yellow.” Cover the jars with parchment paper tied around the neck, leave twelve days, give the fruit time to absorb the liquor and refill the jar to the top. Seal airtightly.

2. "Red Peaches".

Take red variety, treat exactly as for the yellow adding "Raspberry Red" aniline when bottling.

3. "Green Peaches."

Take hard, unripe peaches, peel them with the machine, wash, then blanch by throwing into hot boiling water colored with "Emerald Green" (aniline). Boil until the fruit is softened and cool off promptly in cold running water. Resume the process same as for the yellow peaches, but do not add any coloring to the liquor when bottling.

The green peaches can also be prepared by the salt process as described for the greengages.

APRICOTS IN BRANDY.

Take nearly, but not yet ripe apricots, prick them with the copper pins putting them in alum water (one ounce to six gallons), blanch them same as for candying, placing them back one by one in the alum water, drain, dry them, and put in stone jars pouring over hot boiling syrup at 25° Beaume. Twenty-four hours later drain, reboil the syrup at 28° and pour over. Three days later drain, reboil at 30° and four days later bottle the apricots covering with liquor:

Double proof spirit	2 quarts,
syrup (at 26° Beaume)	1 "

flavor with one per cent. of "Noyaux" spirit or two per cent. of infusion of apricots and peach stones.

Cover the jars with paper and twine. Ten days later the apricots will have absorbed all the liquid they possibly can. Refill the jars with liquor and seal airtightly.

STRAWBERRIES IN BRANDY.

First Quality. Take candied strawberries, leave them in cold water for about ten minutes so as to melt the outside coating of sugar, bottle and fill with liquor:

Double proof spirit	2 parts,
syrup at 32°	1 "

Second Quality. Put berries in small barrel, cover with:

Double proof spirit	2 parts,
water	1 “

after forty days bottle the berries, covering with liquor;

Infusion spirit	4 parts,
syrup at 32°	1 “
water	1 “

BLACKBERRIES IN BRANDY.

Put the berries in jars and cover with:

Proof alcohol	3 parts,
double proof alcohol	1 “
	4 “

and seal jars airtightly. After four weeks, drain and cover with liquor:

Previous infusion spirit	3 parts,
syrup at 32° Beaume	1 “
	4 “

and seal airtightly.

FIGS IN BRANDY.

Prepare same as “Figs in Syrup,” but instead of syrup fill the bottle with lipuor:

Proof spirit	4 parts,
syrup at 30°	1 “
	5 “

and seal airtightly.

Ripe figs would not have as much appearance as those prepared as above but would have better flavor. Peel them and put in glass jars covered with double proof alcohol. After ten days drain. Filter the spirit, add one quart of syrup at 30° to each two quarts of filtered spirit and cover the fruit, then seal the jars airtightly.

NUTS IN BRANDY.

Treat same as "Nuts in Syrup," bottle and cover with liquor:

Proof spirit	4 parts,
syrup at 32°	1 "

then seal the jars.

GREEN NUTS IN BRANDY.

People who are fond of them say they are good for the stomach. They are prepared as follows:

Take unripe nuts; a needle must easily pierce through, but do not prick to the heart with the copper needles. Boil in water containing one ounce of sulphite to each four gallons of water. After a few minutes, when the water is black, take the fruit out, throw them in a new cold bath of sulphite and water. Leave a few hours and reboil in the same water. Repeat the operation until the fruits are softened and the water remains nearly colorless.

Then color green by boiling a minute in plain water slightly colored with "Emerald Green" (aniline color.) Rinse in clear cold water, bottle, covering with same liquor as the white nuts and sealing also in the same way.

MELONS IN BRANDY.

Treat same as "Melons in Syrup," but after they are bottled, cover with double proof alcohol

2 parts,
Syrup at 30° 1 "

3

ANGELICA IN BRANDY.

Take candied Angelica, bottle and cover with liquor.

Proof spirit	4 parts,
Syrup at 32°	1 "

5 "

Seal air tightly.

CHESTNUTS IN BRANDY.

Take candied chestnuts, put in glass jars, cover with liquor

Double proof spirit,	30 quarts,
Sugar (crystalized),	38 pounds,
Water,	55 quarts,
Infusion of vanilla beans,	$\frac{1}{2}$ pint.

and seal the jars air tightly.

MEDLARS IN BRANDY.

Treat exactly as for the "Medlars in Syrup," but after bottling, cover with liquor

Proof spirit,	4 quarts,
Syrup at 30°	1 "
	—
	5 "

and seal air tightly.

MANDARINES IN BRANDY.

Take candied mandarines, put in glass jars with double proof alcohol for thirty days, drain, cover with liquor

Drained alcohol filtered,	2 parts,
Sugar syrup at 32°,	1 "
	—
	3 "

and seal air tightly.

LIMES IN BRANDY.

Treat same as the "Limes in Syrup," but cover with liquor.

Proof spirit	4 parts.
Syrup at 30°	1 "
	—
	5

SYRUPS.

SUGAR SYRUP—PREPARATION—CLARIFICATION.

Plain syrup is merely a solution of sugar or glucose in boil-
in water made strong enough so as not to ferment. In winter time
28° syrup will keep all right, in summer it requires 30°, but to
be on the safe side it should be made at 32° Beaume.

To quickly make 25° syrup take

Sugar	2 lbs.
Water	2 quarts

boil five minutes.

For 31° to 32° syrup, melt on slow fire

Sugar	17 lbs.
Water	6 quarts

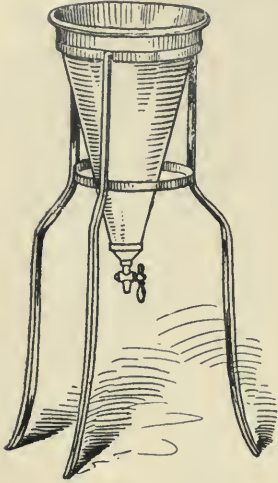
bring to boil and skim.

Even the best refined sugar does not give bright, clear syrup,
it must be clarified. The operation requires no special tools or
machinery. To prepare a batch of syrup, dissolve 110 pounds
of sugar in five gallons of water, add to it three quarts of al-
bumen water, bring to boil stirring continually. As soon as the
foam forms and rises in the kettle, add one more quart of al-
bumen water. Keep on the fire and when it rises again pour
in another quart of the water, then give a good boiling for a
few minutes, stirring all the time.

As soon as the fire is lowered the foam will settle. It has
then a gray, dirty appearance; it contains all the dust and im-
purities which were in the sugar. Remove it with the skimmer,
the syrup is then clear. The boiling should be resumed to bring
it to the desired degree of strength.

The addition of two drachms of acetic acid will improve the
syrup in case it has an oily appearance due to a viscous or
slimy fermentation caused by the growth of the bacilli viscosi.
When still brighter syrup is required, after the clarifying with
albumen water, it should be filtered. For this take a two-gallon,
heavy, white flannel filter. After it is washed in hot boiling

water, lay it in a white osier cone having same shape as the filter and resting itself in a copper cone with a faucet at the bottom. Crush three sheets of gray, French filtering paper.; when reduced in paste, wash it in a few quarts of hot water, then dissolve in two gallons of the hot boiling syrup. Pour in the filter, leave two minutes to settle, then open the faucet. The first few quarts which will not run through clear, will be poured back into the filter. While this filter is ready, you can use it for filtering as many gallons of sugar as you may desire without further preparation or addition of paper.



This enclosed copper filter with a faucet is the only practical way. It retains a coat of steam around the filter which facilitates greatly the work. The osier basket or chemise is to prevent the flannel from resting against the copper filter or cone as this would prevent the liquid from passing through the flannel and consequently to filter.

ALBUMEN WATER.

The albumen water is prepared as follows: Take the white and the shells of ten eggs, add one quart of water and beat well with a willow sticks broom, same as sold by all the bottlers' supplying houses; add slowly more water until making a total of ten quarts (one quart water per egg), add 1-6 ounce of salicylic acid to prevent from spoiling and the albumen will keep several days.

SAVING THE SUGAR WASTE, FOAM, ETC.

All the sugar waste, the foam, etc., is accumulated in a bucket which is in the laboratory for that purpose. Dissolve its contents in about four times its volume of water, stir, boil and skim. You will this way save quite a number of pounds of sugar. The second skimming you obtain will be of no use.

KEEPING STOCK OF SYRUP.

If to be kept in stock the 32° syrup, whether pure sugar, glucose or mixed, should be stored in tinned copper tanks which must be absolutely dry. Place only the cover on when the syrup is entirely cooled off.

PLAIN AND FERMENTED FRUIT JUICES.

Fruit juices are of two kinds.

1. Plain and preserved, which are used for jellies.
2. Alcoholic or fermented juices, used for syrups.

If you boil an unfermented juice with sugar and water you will obtain a jelly. To the contrary, if the juice has been fermented, you will obtain a fruit syrup. However, fruit syrups are often made by mixing sugar syrup with the fruit juice, but in this case as you cannot boil it to insure its keeping, you must add to it at least one ounce of salicylic acid to each six quarts of syrup to prevent the fermentation. This syrup will have little flavor as the proportion of antiseptic is very large; it practically kills the flavor of the fruit. However this method is often used.

The juices which corrode the metal should be kept in gallon stone jars, the others in double gallons of heavy tinplate. These gallons can be used time and time again, if made of lacquered tinplate on the inside, but when emptied they should be well washed and dried. They should also be coated with metallic paint outside (red lead).

APPLE JUICE.

1° white juice for blonde and light color jellies.

Peel the apples, boil two parts apples and one part water, when well melted throw in a large heavy canvas enclosed in a white osier frame or basket. Allow all the clear white juice to drain. Put the juice back in the kettle, bring to boil and pour hot in gallon stone jars which are first rinsed with hot boiling water. Seal with corks which have been soaked ten minutes in boiling water. Keep the jars laying flat in a cool, dark place.

If you have no objection to salicylic acid, add one ounce per six gallons of juice.

If you desire to keep in double gallon cans, fill the tins hot, seal and process at 240° for fifteen minutes.

Pass the apples remaining in the basket through a metallic sieve to separate the core and seeds. It will be of clear color and used later for apple butter. Can in gallons or double gallons. Process:

Gallons,	30	minutes in boiling water;
Or,	10	“ at 240 Fahrenheit.
Double gallons,	50	minutes in boiling water;
Or,	15	“ at 240 Fahrenheit.

2° Ordinary Apple Juice.

For ordinary apple juice, melt one part of apples and one part of water, add to it the peels and cores you may have and boil thoroughly, stirring with a large, wooden spatula or spoon. Drain in the willow basket as described above. Preserve in the same way the juice and the pulp.

The juice obtained will be tinted pink and is to be used for red jellies. The pulp will not be of clear color but slightly brown; it will be used for red jams.

QUINCE JUICE, FERMENTED AND PLAIN.

The quince juice for clear jellies is prepared by boiling peeled and cored quinces in water. When the quince is quite soft, drain the juice and treat same as apple juice. The quarters are canned, covered with 28° syrup and processed.

Gallons,	15	minutes at 240 Fahrenheit.
Double gallons,	23	“ at 240 Fahrenheit.

They will absorb the sugar and later be used for jams and preserves.

The ordinary juice is made by boiling cut up second grade quinces; add the peels you may have and treat as for apples. The pulp you will use for jams.

The fermented juice is made by grating the quince (the pits must be separated). Press the juice in the press, allow to ferment for three or four days and clarify hot by albumen process, (same as for clarifying sugar syrup). Bottle hot in stone jars same as apple juice.

PEAR JUICE.

Pears are treated same as the quinces.

CHERRY, RASPBERRY, STRAWBERRY, RED CUR- RANT, BLACK CURRANT, BLACKBERRY, HUCKLEBERRY JUICE.

Juice of cherries, raspberries, strawberries, red-currants, are made as follows:

Melt the fruits on the fire with one third water, boil and stir. Extract the juice by hydraulic press, reboil and put in stone jars same as apple juice. For the fermented juice, leave it twenty-four hours to ferment in the cellar or basement, clarify by hot albumen process and put up same as fermented quince juice.

LEMON AND ORANGE JUICE.

Lemon and orange juices are always fermented. Take the pulp of the fruits, cut it up, mix with chopped rye straw and press. Ferment the juice six days in the cellar, clarify hot and bottle in stone jars.

To clarify the juices, place them in the kettle, heat to about 190° Fahrenheit, add 2 per cent. of albumen water (see clarification of the sugar syrup), stir well, bring to boil, skim and bottle the juice same as described for apple juice.

ALCOHOLIC FRUIT JUICES.

Alcoholic juices are made by adding 12 per cent. of double proof spirit to fresh pressed fruit juice, mix well, filter through the flannel and bottle. No boiling is required.

FRUIT SYRUPS.

FRUIT SYRUPS BY THE JUICES.

Fruit syrups prepared with the juices are all prepared in the same manner. We will give the cherry syrup as an example. Always bottle warm, seal only when cold with

Phoenix Caps or best grade of corks dipped in double proof spirit. The inside of the bottles must be perfectly dry.

Prepare as follows:

One part (weight) juice (plain or fermented)
One " " sugar

Boil at 30° Beaume. Clarify by albumen process.

Same preparation for syrups of cherries, peaches, apricots, strawberries, red currants, blackberries and huckleberries.

SYRUPS OF FRESH FRUIT.

FRESH STRAWBERRY SYRUP.

Crush and bring to boil, then strain.

Strawberry	3 parts
Sugar	6 "
Water	2 "

SYRUP OF QUINCE.

Fermented juice	10 parts
Sugar	17 "

Boil, filter and reboil to mark 36° Beaume

GENUINE GRAPE SYRUP.

Press fresh grapes, leave the juice in contact for one hour with pieces of marmor or natural chook. Filter and boil until 31° Beaume is reached.

FANCY SYRUPS.

KIRSCHENWASSER PUNCH SYRUP.

Sugar	11 lbs.
Kirschenwasser	5 quarts
Double proof spirit	3 1-2 quarts
Lemon spirit	1 quart
Citric acid	1-4 ounce

Dissolve first the sugar in water making syrup of 32° Beaume, stop boiling and add the spirit, kirschenwasser, lemon and acid.

COGNAC SYRUP.

Sugar	550 parts
Brandy	300 "
Lemon spirit	1 part
Citric acid	1-2 "

Dissolve the sugar in weak tea making a syrup of 32° Beaume, then add the brandy, lemon and citric acid.

JAMAICA RUM SYRUP.

Sugar	500 parts
Rum	200 "
Double proof spirit	100 "
Lemon spirit	1-4 "
Orange "	1-4 "
Citric acid	1-2 "

Prepare by dissolving the sugar in weak tea and prepare same as cognac syrup.

MARSHMALLOW SYRUP.

Crush white marshmallow roots into small pieces and boil three quarters of an hour in water. Dissolve your sugar in this water and boil to 30° Beaume. The syrup will be cloudy. Filter hot through the flannel, filter with crushed filter paper same as described for clarification of sugar syrup.

GENUINE VIOLETTE SYRUP.

Wash the flowers, leave them in water for two hours and cook them in the same water in a tinned copper bain marie for twelve hours. Squeeze in a hand press, add sugar to the liquid until it reaches 32° Beaume and filter hot same as marshmallow syrup.

This syrup will have a light purple blue color; a few drops of ammonia will make it turn green. The artificial colored syrups or imitations will not turn green by the addition of ammonia; they will turn red by the addition of vinegar, the genuine will not.

ROSE SYRUP.

Rose water	1 quart
Water	2 "

Dissolve the sugar in cold rose water, place on slow fire adding pure sugar until 30° Beaume is reached, color light pink and filter.

ORANGE FLOWER SYRUP.

The orange flower syrup is prepared in the same manner as rose syrup, but using orange flower water.

FRUIT SYRUPS BY THE FRUIT EXTRACTS.

The progressive manufacturer should prepare his juices in the form of extracts and all that would be required for him is to keep a stock of plain sugar syrup at 30° Beaume. He could then at any time prepare syrup of the kind desired by mixing.

Cold syrup	50 parts
Extract	1 "

The syrup must be bottled in perfectly dry bottles and sealed with corks previously dipped in double proof spirit. The extracts should be prepared as follows:

EXTRACT FORMULAS.

STRAWBERRY SYRUP EXTRACT.

Strawberry water	2 quarts
Strawberry spirit	4 "
" Alcoholic juice	3 "
Cochineal extract	1 "
Cudbear	1 "
Tartaric acid	3 lbs.

Mix in a glass demijohn and filter a few days later.

RASPBERRY SYRUP EXTRACT.

Distilled raspberry water	20 quarts
Alcoholic juice	20 "
Raspberry spirit	4 "
Strawberry spirit	3 "
Cudbear extract	15 "
Tartaric acid	45 lbs.

RED CURRANT SYRUP EXTRACT.

Alcoholic red currant juice	55 quarts
Alcoholic sour cherry juice	5 "
Fermented black currant juice	6 "
Distilled water of raspberry	6 "
Distilled spirit of strawberry	3 "
Tincture of Vanilla	1 "
Tartaric acid	40 lbs.
Citric acid	10 "
Cudbear extract	35 quarts

BLACK CURRANT SYRUP EXTRACT.

Alcoholic black currant juice	25 quarts
Distilled black currant spirit	22 "
Raspberry extract (made as above described)	2 "
Strawberry " "	2 "
Tartaric acid	9 lbs.
Cudbear extract	12 "

BLACKBERRY SYRUP EXTRACT.

Alcoholic blackberry juice	25 quarts
Distilled black currant spirit	2 "
Distilled raspberry water	2 "
Distilled strawberry spirit	4 "
Cudbear extract	18 quarts

PINEAPPLE SYRUP EXTRACT.

Grate fresh, well-ripened pineapples, put in double gallon cans, adding two-thirds of a pint of water per gallon, seal air-tight and process one hour at 240° Fahrenheit.

When cold press under hydraulic press and prepare extract.

Pineapple juice	20 quarts
Strawberry spirit	4 "
Citric acid	4 lbs.
Tartaric acid	6 "

Filter and bottle.

LEMON SYRUP EXTRACT.

Lemon spirit	20 quarts
Fermented lemon juice	20 "
Citric acid	15 lbs.

ORANGE SYRUP EXTRACT.

Fermented orange juice	5 quarts
Orange peel infusion	5 "
Orange spirit	15 "
Citric acid	6 lbs.
Tartaric acid	4 "

GRENADINE EXTRACT.

Lemon distilled spirit	1 quart
Lemon peel infusion	1 "
Orange distilled spirit	1 "
Vanilla infusion	1 pint
Raspberry extract (made as above described)	8 quarts
Alcoholic black currant juice	1 quart
Tartaric acid	15 lbs.
Cochineal extract	9 quarts

COFFEE EXTRACT.

Take good quality of beans, 1-2 Java, 1-4 Mocha, 1-4 Antillas or Mexican beans. Roast your beans in a cast or sheet iron roaster on direct fire, the beans should be roasted black; they must be over-roasted. Cool off in open air without addition of water. Grind the beans.

Put in double gallon cans, cover with hot, boiling water, seal air-tightly and process two hours at 240° Fahrenheit. Open your cans when cold, strain and bottle.

Roasted coffee beans	12 lbs.
Water	42 quarts

ORGEAT (Bitter Almonds) EXTRACT.

Alcohol (double proof)	22 quarts
Benzoin	6 1-2 lbs.
Bitter almond essence	1-4 lb.
Orange flower water	7 quarts
Lemon spirit	1 quart
Tartaric acid	1 1-4 lb.

Dissolve first the benzoin in the alcohol, then add the other products.

All these extracts give the highest grade of syrups, they keep for years, will never spoil, but gain by age. In the formulas will be found the ways and means to prepare the spirits, fruit waters and various products used to prepare them. (See the index.)

ORIENTAL ROSE SYRUP.

Fine syrup is also made by adding to plain sugar syrup the necessary quantity of rose essence. This syrup is much used in the Orient, and is one of the finest and most delicate when prepared with the genuine rose essence. The imitation is made by substituting geranium essence for rose essence.

IMITATION VIOLET SYRUP.

An imitation of violet syrup is made as follows:

Iris root alcoholic infusion	1 quart
Cold syrup at 32° Beaume	6 quarts

Color with aniline purple.

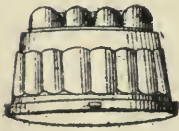
VANILLA SYRUP.

Cold 32° sugar syrup	50 parts
Vanilla bean infusion	1 part

FRUIT JELLIES.

Pure sugar jellies are made by merely boiling the juice with sugar, two pounds of sugar per quart of juice, skim and boil until it drops in jelly from the wooden spoon or spatula.

It is very essential that your jellies be bright and clear, and in order to obtain this the sugar should be first put in the kettle, adding just enough water to dissolve it. Constantly skim the foam and boil until the sugar is brittle. The sugar is brittle when, dipping your finger in cold water then in the syrup then quickly in cold water again, it will form a solid coating to your finger, being transparent and brittle.



Oval airtightly sealed
mould-shaped jelly
jar.

At this time add your juice, boil until it will drip in jelly from the spoon, at which time your jelly should mark 32° Beaume.

Pure sugar jellies are too sweet for the average taste—1-2 sugar and 1-2 glucose is often preferred by the consumer.

The above is the best way to prepare high-grade jellies of the following fruits: Apples, pears, quinces, strawberries, raspberries, blackberries, red currants, black currants, etc.

However, as the berries only give a soft jelly, it is advisable to use 1-2 or 2-3 berry juice and the balance of apple juice.

When boiling jellies, they are liable to raise, swell, foam, and flow over the kettle. Always keep a bottle of refined cotton or salad oil handy, a few drops will at once bring the jelly back to its proper level in the kettle.

Orange, lemon and pineapple jellies are prepared in the same way.

1-2 Orange juice,

1-2 Apple “

or all apple juice flavoring with one per cent. of either orange or lemon distilled spirit, adding

1-3 lbs. of Citric acid,

1-2 “ Tartaric acid,

to each 100 lbs. of jelly.

When flavoring with the distilled spirit stop boiling before adding it and do not boil afterwards.

The syrups which have been used for the candying fruits come handy for the jellies, especially for the strawberries, as they are well flavored by the fruits.

For yellow jellies (quince, orange, lemon and pineapple) white apple juice should be used, the ordinary common juice for the red jellies. (See apple juice.)

VEGETAL COMPOUND JELLIES.

A good grade of trade jelly is made in using a certain proportion of Japanese gelatine, a purely vegetable product (Ay-Thas-Gelose).

It is necessary to use two kettles, which I will call No. 1 and No. 2.

Kettle No. 1. Melt on slow fire with necessary quantity of water

65 lbs. Sugar,

135 “ Glucose.

Boil and skim.

Kettle No. 2. Dissolve on slow fire 2 3-4 pounds Japanese gelatine which has previously been allowed to soak and swell in cold water for six hours. When dissolved add 45 pounds glucose, boil, skim and mix with contents of kettle No. 1.

In kettle No. 2, which is now empty, put 45 quarts of juice (apple, quince, currants or berries juice) and bring to boil.

Turn off the steam or take the two kettles off the fire, mix both contents, adding 1 1/2 pounds tartaric acid dissolved in two quarts of hot water.

This would give 450 pounds of jelly.

When required the jelly should be colored by addition of
Cochineal extract for strawberry,
Cudbear extract for other red jellies.

Cheaper jelly is made by using glucose only, flavoring with smaller quantity of juice and using one ounce of Japanese gelatine for each three quarts of jelly desired, the cost price being not over 2-3 of a cent per pound of jelly which should mark 32° Beaume when ready to put in cans or jars.

The melted gelatine can be boiled with the sugar. If the Japanese gelatine solution is not clear it should be filtered hot through a flannel filter.

It must be remembered that this gelatine must never boil in contact with fruit juices or tartaric or citric acid, as it would destroy its properties and not take into jelly any more. Same if you re-melt your jelly after it has cooled off, it will not take solid again unless new gelatine solution is added.

When put up in tin cans these should be lacquered inside. The cans or glass jars should be sealed air-tightly while hot. If jellies are processed it should be for one hour at 212°, but this always darkens them and often makes them cloudy.

Jellies made with Japanese gelatine cannot be processed as the acid of the fruit would act on the mucilaginous matter of the gelatine and prevent it from taking into solid jelly again.

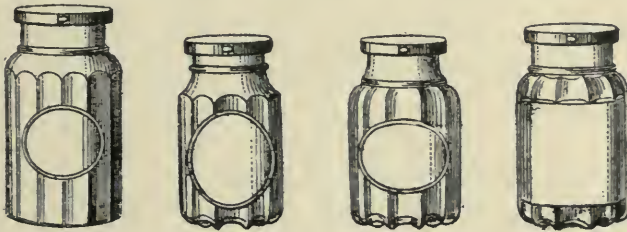
FRUIT JAMS.

Jams are made with either fresh fruits or fruit pulp. If made from fresh fruit, boil them first with water same as if for making pulp, that is to say with about one quart of water for each twenty pounds of fruit. Dissolve four parts of sugar and boil same as for the jellies and add five parts of fruit and boil until the liquid drops into jelly from the spoon. This will make the highest grade.

Second grade is made as follows:

Fruit pulp	100 lbs.
Sugar	30 "
Glucose	70 "

Boil, adding to it just before putting in cans or jars 1 1-4 pounds Japanese gelatine dissolved as described for "Jellies." To reduce the cost, pumpkin, carrots, beet pulp, etc., are used in place of higher priced fruits. Red jams should be colored with cudbear.



Jam Jars

The above described covers the following: Strawberry, raspberry, red and black currant, cherry, plum, apple, blackberry, huckleberry, damson, gooseberry, rhubarb, etc.

Another process to prepare attractive and fine jams of cherries, strawberries, pears, figs, quinces and pineapple is to prepare these fruits during their respective seasons, same as if they were to be candied, but using ripe or near ripe fruits.

No bleaching or blanching is required. Throw your fruits in hot syrup at 24° Beaume, boil three minutes and repeat the operation twelve hours later. The third time put your fruits in double gallons, cover with hot, boiling syrup at 32° Beaume, seal and process 35 minutes at 225° Fahrenheit. In the winter use these to make your jams. You will find that the fruits have absorbed the sugar. Apple juice will be used to form the body of this jam, which must be clear to show the whole fruits it contains.

GRAPE JAM.

Grape jam is prepared by merely boiling $\frac{1}{2}$ grapes, whole fruits, with $\frac{1}{2}$ juice of fresh pressed grapes. When it reaches 32° Beaume pour in cans or glasses. No sugar is to be added.

Another process which is used in families and gives a fine jam is this: Boil in water 10 pounds red, common carrots, strain and chop the carrots as tiny as possible. Boil five pounds common cooking pears in as little water as possible. When thoroughly cooked, chop in small pieces, then mix together the

10 lbs. cooked and chopped carrots.

5 lbs. cooked and chopped pears.

the water in which the pears have boiled.

15 lbs. sugar

10 " (the juice of 20 lbs. grapes).

10 lbs. fresh grapes.



ORANGE MARMALADE.

ENGLISH FORMULA.

Scald, then peel the oranges and cut the peels in thin slices, like shavings. Cut the oranges in pieces, take out the pits which would give a bitter taste and whatever is left of the white skin; to each four pounds of this pulp, add six pounds of sugar and one quart of apple juice, add the sliced peels and boil slowly for one hour, after which boil hard until the marmalade is thick enough. Pour in cans or jars.

The bitter oranges are preferred:

FRENCH FORMULA.

Prepare same as for English, but boil the sliced peels in water until they are actually boiled. Drain and cover with hot boiling syrup at 20° Beaume. Keep it hot without boiling and put in stone jars over night. Drain, reboil your syrup, adding glucose to make it 26° and pour over the peels allowing to stay three days. Drain, reboil the syrup at same degree and pour hot over the peels. Three days after you can prepare your jam.

The orange itself has been cut, the pits taken out. Mix the pulp with chopped, clean rye straw and squeeze in a strong press, as the juice is hard to extract. The rye straw will be of great assistance. Put your juice in a Kettle, boil five minutes and put in boiling hot stone jugs, just as they are rinsed with boiling water. Cork immediately with corks soaked in boiling water. Lay the jugs flat in a cool place.

To make the marmalade, drain the peels and boil together the syrup, the orange juice taken from the jugs and double quantity of apple juice; after boiling five minutes, filter through a flannel filter.

Syrup	10 quarts.
Orange juice	5 "
Apple juice	15 "
Sugar	10 lbs.
Candied sliced peels	15 "

Boil hard until it drops in jelly from the spoon, this gives a clear and transparent marmalade.

CORDIALS.

A few of the finest liquors can easily be made by the Conserve manufacturers having a laboratory. I give herewith some formulas of fruit cordials.

ORANGE CORDIALS.

HOLLAND CURACAO.

Take the rind of	30 oranges
Cinnamon	1-3 ounce
Mace (second coat of the nutmeg)	1-6 ounce
Alcohol, double proof	7 quarts
Crystalized sugar	6 lbs.

Mix and allow to infuse in the spirit for eight days, then distill and add the sugar dissolved in water.

ORANGE LIQUOR.

Orange peels	2 lbs.
Lemon "	1-3 "
Cinnamon	3 ounces
Cayenne pepper	1 ounce
Double proof spirit	10 quarts

Allow to infuse for ten days, then distill. Mix with nine pounds of sugar dissolved in water, filter if necessary, color orange yellow.

LEMON CORDIAL.

Infuse the rind of thirty lemons in ten quarts of double proof spirit for three days, distill to obtain six quarts, add two quarts water to these six quarts and distill to obtain four quarts of fine lemon spirit. Add to these ten pounds of sugar dissolved in two quarts of water, color yellow and filter.

GERMAN LEMON CORDIAL.

Rind of lemons	1-2 lb.
“ “ oranges	1-4 “
Cloves	1 ounce
Mace	1 “
Double proof alcohol	11 quarts
Water	1 quart

Infuse for ten days, strain and add sugar syrup to make twenty quarts, color yellow and filter.

RASPBERRY CORDIALS.

CREME DE FRAMBOISE.

FORMULA No. 1.

Raspberry spirit,	5 quarts
Double proof alcohol,	3 “
Sugar,	10 lbs.
Water,	11 quarts

Color with cudbear.

FORMULA NO. 2.

Raspberry juice,	1 quart
Double proof alcohol,	1 “

Mix and filter, then add

Raspberry water,	1 quart
Double proof spirit,	2 “
Water,	5 “
Sugar,	6 lbs.

STRAWBERRY CORDIAL.

Strawberry spirit,	3 quarts
Strawberry juice,	2 "
Double proof spirit,	1 "

Filter, then add sugar, ten pounds, and water, seven quarts.
Color with cochineal.

CHERRY CORDIAL.

French "Guignolet" Liqueur.

Infusion of black ripe cherries,	4 quarts
Double proof spirit,	1 "
Sugar,	10½ lbs.
Water,	3 pints

BLACK CURRANT CORDIAL.

FRENCH "CASSIS." FORMULA NO. 1.

Ripe black currant,	7 lbs.
Black currant leaves,	1-3 lb.
Cinnamon,	1-8 ounce
Alcohol (proof)	7 quarts
Sugar,	3 lbs.
Water,	3 quarts

Infuse the fruits, leaves and cinnamon in the spirit for three weeks, strain and add the water in which the sugar has been dissolved.

FORMULA NO. 2.

Infusion of black currant,	10 quarts
Infusion of raspberry,	1 "
Double proof spirit,	1 "
Sugar,	10½ lbs.
Water,	3 quarts

COFFEE.

FORMULA NO. 1.

CREME DE MOKA.

Coffee water,	10 quarts
Alcohol (double proof)	14 “
Sugar,	12 lbs.
Water,	15 quarts

Color with burnt sugar.

FORMULA NO. 2.

Coffee spirit,	10 quarts
Double proof spirit,	2 "
Sugar,	42 lbs.

Dissolve in enough water to make 40 quarts of cordial.

FORMULA NO. 3.

Extract of coffee (see syrup extracts)	1 quart
Double proof spirit	4 quarts
Water	1 quart
32° syrup	2 quarts

QUINCE CORDIAL.

Fresh quince juice	15 quarts
Cloves spirit	1 pint
Alcohol (double proof)	30 quarts
Sugar	60 lbs.
Water	25 quarts

PINEAPPLE LIQUOR.

Grate one two-pound apple and cover with four quarts double proof spirit. Two weeks later, strain, filter and add ten pounds of sugar dissolved in four quarts of water and flavor with a little vanilla infusion.

BLACKBERRY BRANDY.

Blackberries	7 pounds
Double proof spirit	3 quarts

After ten weeks, strain, filter, mix with one quart double-proof spirit in which have infused one-half ounce cloves, one-quarter grated nutmeg, one-half ounce cinnamon, filter and add water one quart, sugar one-half pound.

BLACKBERRY LIQUOR.

Blackberries	7 lbs.
Double proof spirit	3 quarts
Sugar	2 lbs.
Water	4 quarts

CELERY CORDIAL.

Celery spirit	4 quarts
Alcohol (double proof)	2 "
Sugar	17 lbs.
Water	8 quarts

NOYAU.

Kirschenwasser. Put all the stones and pits of your cherries, peaches, plums, etc., in a barrel, cover with proof spirit and distill after infusion. Rectify.

To make "Creme de Noyau," add two parts with one part of sugar syrup at 32° Beaume.

MARASCHINO CORDIAL.

Noyau,	2 parts.
Orange flower water,	$\frac{1}{2}$ pint
Raspberry spirit or water	$\frac{1}{2}$ "
Sugar,	24 lbs.
Water,	3 $\frac{1}{2}$
Double proof spirit,	1 pint

ORANGE FLOWER.

Creme de Fleur d'Oranger. Formula No. 1.

Orange flower water,	4 quarts
Double proof spirit,	20 "
Sugar,	20 lbs.
Water,	9 quarts

FORMULA NO. 2.

for 55 quarts cordial.

Neroli essence,	3-8 oz.
Orange flower water,	1 quart
Water, sugar and spirit according to taste.	

ROSE CORDIAL.

Rose water,	2 quarts
Double proof spirit,	5½ "
Sugar,	10 lbs.
Water,	9 quarts

Color pink with cochineal.

VIOLET CORDIAL.

Iris root infusion,	10 quarts
Double proof spirit,	20 "
Sugar,	85 lbs.
Water,	45 quarts

VANILLA.

"Creme de Vanille."

Common grade:

Vanilla infusion,	1 quart
Double proof spirit,	20 quarts
Sugar,	20 lbs.
Water,	60 quarts

Superior grade:

Vanilla infusion,	1 quart
Double proof spirit,	3 quarts
Sugar,	10 lbs.
Water,	2 $\frac{1}{2}$ quarts

DISTILLED FRUIT WATERS.

Distilled fruit water is the finest flavoring for cordials, ice cream, confectionery, etc.

RASPBERRY AND BLACK CURRANT WATER.

For raspberries and black currant,

Distill 50 lbs. fruit

5 quarts water

to obtain sixteen quarts of fruit water.

APRICOT, PEACH AND STRAWBERRY WATER.

For peach, apricot and strawberry,

Distill 50 lbs. fruit

5 quarts water

to obtain twelve quarts of fruit water.

These extracts will keep for years if carefully bottled and kept in a dark, cool place.

ROSE WATER.

Distill 22 lbs. fresh rose leaves

15 quarts water

$\frac{3}{4}$ lb. salt

to obtain five to seven quarts of rose water.

ORANGE FLOWER WATER.

Orange flowers, 10 lbs.

Water, 40 quarts

Salt, 1 lb.

Distill to obtain ten quarts of orange flower water. Should it turn cloudy add some more magnesia and filter.

FRUIT SPIRITS.

RASPBERRY SPIRITS.

Raspberry,	20 lbs.
Double proof spirit,	12 quarts
Water,	5 “

Distill to obtain ten quarts spirit.

STRAWBERRY SPIRIT.

Same as raspberry.

ORANGE AND LEMON SPIRIT. ✕

Distill rind of	100 oranges
Double proof alcohol	15 quarts
Water	5 “

to obtain thirteen quarts of spirit.

COFFEE SPIRIT.

Distill six pounds of roasted and ground coffee with twenty quarts of double proof spirit and ten quarts water, the coffee must have infused a few days in the spirit. Distill to obtain nineteen quarts of coffee spirit.

NOYAU SPIRIT.

Noyau spirit, and peach, and apricot stone spirit is made by covering the broken stones with double proof spirit, three weeks later, distill two parts infusion spirit and one part water.

CELERY SPIRIT.

Celery seeds,	2 $\frac{1}{2}$ lbs.
Alcohol (double proof),	10 quarts
Water,	5 “

Distill to obtain 9 $\frac{1}{2}$ quarts celery spirit.

CORIANDER SPIRIT.

Coriander seeds,	3 lbs.
Double proof spirit,	10 quarts
Water,	5 “

Distill to obtain ten quarts.

CLOVES SPIRIT.

Broken cloves,	6 lbs.
Double proof spirit,	50 quarts
Water,	23 “

Distill to obtain 48 quarts of spirit.

CHINESE CINNAMON.

Powdered cinnamon,	1 lb.
Double proof spirit,	7 quarts

After 48 hours infusion add 3 $\frac{1}{2}$ quarts water. Distill to obtain seven quarts.

CEYLON CINNAMON.

Powdered cinnamon,	2 lbs.
Double proof spirit,	30 quarts
After 48 hours add water,	15 “

Distill to obtain 29 quarts of spirit.

VANILLA INFUSION.

Crushed vanilla beans,	1-3 lb.
Double proof spirit,	6 quarts

After six weeks strain and filter.

CHINESE CINNAMON.

Powdered Chinese Cinnamon,	1 1-2 lbs.
Double proof spirit,	1 quart

CEYLON CINNAMON.

Powdered cinnamon,	1 lb.
Double proof spirit,	1 quart

CLOVES INFUSION.

Powdered cloves,	1 lb.
Double proof spirit,	4 quarts

IRIS ROOT INFUSION.

Powdered iris root,	1-2 lb.
Double proof spirit,	1 quart

Filter after two weeks.

MANDARINE, ORANGE AND LEMON INFUSIONS.

Rind,	1 lb.
Double proof spirit,	1 quart

Drain and filter one month later.

ALCOHOLIC INFUSIONS OF FRUITS.

Strawberries, raspberries, black currant and cherries. Crush the fruits, and for each two pounds add one quart of double proof spirit, and after six weeks drain and filter.

CUDBEAR EXTRACT.

Cudbear is a fine claret red color which is perfectly harmless. Mix half pound of powdered cudbear with one quart of double proof spirit, after one week filter. It is the most powerful vegetable color, its cost being only the alcohol, as the cudbear is only worth a few cents per pound.

COCHINEAL EXTRACT.

Powdered black cochineal,	1 pound
Alum,	1-4 "
Cream of tartar,	1-4 "
Water,	8 quarts

First boil your water and add the cochineal, after five minutes add the cream of tartar and alum. When dissolved, allow to cool off. One-quarter ounce of tartaric acid will make it brighter red and the addition of one part alcohol to two parts preparation will insure its good keeping qualities.

FRUIT PASTE.

The fruit paste is more in the line of the confectioner, however, as they do not require any special tools or machinery and apply to the same trade as glace fruits, I will give here their preparation.

Take fine white apples, peel, core and slice, throwing the pieces in water containing one ounce sulphite of soda per five gallons of water, this will keep them white.

Place the slices in a kettle with two quarts of water for each thirty pounds of apples and boil, stirring continuously until the apples are cooked and melted.

Pass the juice and pulp through a very fine hair sieve with an equal quantity of pulp of the fruit desired to make the paste of raspberry, strawberry, peach, apricot, quince and greengage.

Mix equal weights of the mixed pulp and cooked sugar prepared as follows:

Boil sugar and water until, when dipping the finger in cold water, then in the syrup and in cold water again, the sugar will still adhere to the finger, forming a little ball, then the required strength is reached.

Boil a little while on strong fire, color with aniline, then pour on tin plate sheets in layers of 1-4 to 1-3 inches in thickness. Allow to dry one day in the hot room used to dry the candied fruits.

The paste is then cut in disks, stars or other shapes; place in the crystalization boxes and crystalize same as the crystalized fruits.

BACTERIOLOGY APPLIED TO CANNING.

Undoubtedly the study of the formation, growth and life of the bacillis has been a great help to the modern preserver; however these dreadful microbes are not so terrible as generally represented. Their study is one of the most fascinating, but this is no reason why we should only see and dream microbes, and most of the treatises on the subject seem to have been made with a view to deprive the canner of the few hours' sleep he is entitled to after his hard labor.

Each fruit by itself is a living being, the life of which is destroyed at the temperature of 180 Fahrenheit. Should the heat not have reached the necessary temperature, or should it not have penetrated the whole fruit, the parts which remained alive will ripen further and the chemical reaction therefrom will reduce the sugar into alcohol and carbonic acid, thus creating a condition often favorable to the growth of bacteria, which in the original condition would have remained in the state of spores and not have developed.

Hence the necessity that each molecule contained in the receptacle which is Pasteurized should be actually heated at 180 degrees. This temperature will destroy the life of all the actual living bacteria and should the Pasteurized product not undergo any changes, these pores will remain in their state of latent life. In a culture media offering the most favorable conditions for the development of the spores, they would sprout, but all the products we consider in the canning industry have enough antiseptic strength in them to constitute a combined condition utterly unfavorable to their passage from latent to active life. The agents referred to are the natural products, such as acids, uncrystalizable sugar, etc., contained in the fruits as well as the salt and sugar which are contained in the dipping liquid or brine.

The bacteria germs in their dry or latent state of life are everywhere; the air and the water being their vehicle, every particle of air being actually all alive and containing germs of various kinds ready to sprout the instant they find a field favorable to

their development. Their nature is more of a vegetal than animal determination if we can call such this lower form of livings; they can not be compared better than to a mushroom, and there are many varieties of bacteria as there are varieties of mushrooms; their work is the same, the disintegration.

This disintegration, of course, is not made without a chemical change in the nature of the decomposed product; it practically splits the product into fractions of lower or simpler chemicals; in other words it tends to reduce the vegetable or animal matter into the elementary forms. It is not powerful enough to set free the molecules, to set on one side the carbon, on another the hydrogen and on a third the oxygen, but it splits the work; does it by fractions.

Take, for example, a batch of fruit juice; a powerful microscope will show the presence of nearly every family of the known microbes, but its present state is not favorable to the development of all of them. First on the surface, which is in contact with air, the great bacteria carrier, the fermentation will take place and the mold will appear. This mold is a mold fungus of which there are many varieties, but with about the same characteristics. They require oxygen for their growth and will develop so much quicker the nearer they are on the surface, where they can draw all the oxygen they require from the air.

These molds constitute a coating keeping the germs in the inside of the liquid from contact with the air, and these other air-requiring microbes will not be able to develop. But this anaerobic condition (anerobic-privation of air) is the most favorable for the germination and development of other bacteria.

In the same time as the mold another germ, the *bacillis lactici acidi*, has germinated in contact with the air decomposing the sugar into $C_6H_{12}O_6$ (sugar), $2C_3H_6O_3$ (lactic acid).

The absence of air and the presence of lactic acid being most favorable to the growth of the Butyric acid bacteria, it will germ and prosper, attacking directly the sugar as well as the lactic acid and all organic matters, reducing them into Butyric acid, hydrogen, ammonia, etc.

But if instead of leaving the mold fungus grow in an easy way on the surface of the liquid, taking from the air all the

oxygen it desires, if the mold is submerged, pressed down into the liquid, from an aerobic it will be forced into an anaerobic state, it will violently attack the sugar, disaggregating it into alcohol and carbonic acid which will be set free. When all the sugar will be decomposed, split into these two new products, alcohol which remains and the carbonic acid which has escaped; the nature of the fruit juice is changed, no sugar is left, and the mold fungus, yeast fungi not being able to disintegrate the alcohol formed, will in fact die from lack of food.

$C_6H_{12}O_6$ (sugar) = $2C_2H_6O$ (alcohol) + $2CO_2$ (carbonic acid).

But the new liquid fulfills all the requirements for the development of other bacilli; the butyric acid bacilli will sprout and decompose further.

PTOMAINES.

The same bacteria produces various chemical reactions according to the conditions under which it attacks the organic matter, and especially when forced into a state in which it cannot obtain its supply of oxygen as it would in the natural way; the reactions that take place are liable to produce alkaloids which are poisonous. By their nature they are similar to the nicotine, morphine, etc.; therefore in a tin can or glass jar airtightly sealed where the supply of air (oxygen) is limited, if the processing has not been sufficient to force the heat through the whole contents, the aerobic microbes will resume their work, but soon, by the lack of oxygen, they will be forced into an anaerobic state; they will draw the oxygen from the organic matter, forming acids which by their reaction on alkaline substance will produce alkaloids deadly to man.

The ptomaines, name under which these alkaloids are designated, are especially the product of the disease bacteria which are found in the air, the water, in the milk, meat, fishes, and especially all products of albuminous nature. These pathogenic bacteria are seldom met in vegetables where the principal enemies we have to fight with are the mold fungus, the lactic and butyric acid bacteria.

The yeast fungi, the aspergillus glaucus so common in damp places, are quite easily destroyed by heat. The sugar, the acid of

the fruits or salt brine added to the vegetables readily prevent the growth of the various micoderma, *M. vini*, *M. aceti*, etc., to which we will add the *Mucor Racemosus* and the *Pencillium glaucus*.

If a mold has formed and developed at the time the goods are packed, the mold will be preserved same as the fruit; but if the putrifaction agents such as the bacillus butyricus or the bacillus amyglobacter have started their work of decomposition, the part they have spoiled will remain so; they grow without air, and the confinement in a sealed receptacle will greatly favor their growth. The bacillus prodigiosus and the bacillus lacti acidi, if they have germinated, will grow anaerobic in the cans and spoil the contents.

Should it be possible to take a fruit out of a lot, examine it to ascertain what kind of germs of spores are on it, and refer to an index to find out how long processing would destroy them, it would be very convenient, but practically hundreds of varieties are represented on each fruit; they require various conditions to develop and they are watching the various phases of the decomposition to sprout and prosper each at their turn and complete the work of disintegration decompose the matter they attack into its elementary forms. For this reason a long list of bacteria, their shape, their color, the temperature at which the adults are killed by the heat, the temperature required to destroy their spores, etc., is of no use and no help to the conserve manufacturer, but it is a very interesting and fascinating study, and if you have time to spare I could but recommend it. However, do not expect to draw wonders from it; the brutal fact will remain that the length of processing will be left to your judgment, and basis on which to establish your judgment will be not the possibility that a specimen of such or such kind of micro-organism may have found its way in this can or the other, and start with it a game of hide and seek in which gray hair is all you would gain. Neither will it be that you should process your peaches one hour at 250 Fahrenheit, because you will find out that all the peaches have germs of the bacillis butyricus and that this temperature is required to destroy them. No; you will merely take into consideration the ripeness and the size of the fruits, the thickness of the syrup or brine, the size of the can or jar and by comparison deduct the length of time required for the

heat to penetrate the very heart of the contents. Use closed retorts and high temperature when saving time is required.

ACTION OF THE BRINE ON BACILLUS.

To obtain sound goods the cans or jars must be sealed perfectly air tight and processed for the proper length of time. It is very important that the fruits, vegetables or meat be perfectly sound and in as proper condition as if they were to be eaten raw. All fermentation or spoiling must be avoided before the products are canned, and as soon as the sealing is made the cans or jars must be processed, for the reason that the majority of the germs develop most favorably in a temperature of 20° to 35° Centigrade (67° to 96° Fahrenheit) which is commonly attained in the packing room and the bacteria would promptly set to work. It is for some goods recommended to dip with hot syrup or brine; the object of such recommendation was originally to help to destroy the ferments contained in the fruits or vegetables, but I consider that it has no other meaning than a recommendation to only employ a syrup or brine which is not in a state of fermentation and is not contaminated. If your syrup is light and one or two days old, it is most likely that some bacteria have sprouted, dipping with this syrup would be to introduce the enemy in your fortress, the advice of brining hot will oblige you to boil this syrup and destroy the growth.

ANTISEPTIC POWER OF SALT BRINE.

The same applies to the salt brine. This brine used to dip the vegetables marks 2° to 3° Beaume; the percentage of salt it contains has sufficient antiseptic strength to prevent the germination of the spores when the adults have been killed by the heat, but it has not sufficient power to prevent the adult to work if they exist in the solution. Therefore should this brine be made with cold water, it would contain all the ferments actually developed in the water and when poured in the cans these ferments will attack the eatables and may produce partial decomposition before the pasteurization is completed by the processing.

The brine may not only convey molds and common decomposition bacteria, but also germs and adult pathogenic bacteria

(Disease Microbes) and the boiling of the brine is a good precautionary measure.

When syrup or brine, after boiling, is placed in a tank, it must not be closed with a cover as long as it is hot as the steam and vapor rising from the liquid would condense against the cover driving with them the spores contained in the air, and the temperature of these waterdrops, being most favorable to the germination of the germs, they would in very short time sprout and reach adult state; these drops falling from the cover into the brine in the tank will convey with them the adult bacteria and soon the whole tank would be in a state of fermentation.

Salt brine containing sugar as used for some vegetables will be more subject to prompt decomposition and greater care will have to be taken and when possible saccharin should be substituted for sugar as saccharin is in itself an antiseptic.

AIR TIGHT SEALING OF CANS AND GLASS JARS.

The necessity of air-tightly sealing the packages is clearly shown. For tin cans no difficulty has ever existed, the mixture of lead and tin being the natural device to secure the sealing of the cover to the body of the can. The difficulty of obtaining an air tight closure of the glass jars has for years past been one of the greatest drawbacks to their use. Every man connected with the canning or preserving industry in some way has undoubtedly spent many hours, if not money, trying to reach the ideal, until a few years ago when the Phoenix Caps were placed on the market. They have been from the start adopted by the most progressive houses in the country. R. C. Hickmott, Bishop on the Pacific Coast, Reid, Murdoch in Chicago, Dunbar in New Orleans, H. J. Heinz, of Pittsburgh, E. C. Hazard in New York and Philip J. Ritter in Philadelphia, being among the champions of the packing in glass.

The requirements of a glass package are first the air tight sealing which has first been obtained by sealing the jars with corks and tying them with wire so as to prevent their being blown out by the inside pressure while processing. However, during the boiling some air and steam from the inside of the jar forces their way out and while cooling off produces a vacuum,

and owing to the porous nature of the cork, the air from the outside, not pasteurized, is sucked through the porosity of the cork, gets into the jar causing its contents to be attacked by the germs contained in the said air and soon the decomposition takes place.

The glass stopper came next and was at a time in universal use. The idea was to maintain the jars containing the fruits or vegetables in boiling water for about 20 minutes, the boiling water bath reaching the neck near the very top of the jar. Then the glass stopper which was coated with a solution of rubber was placed and the jars allowed to cool off. The defects of this system were the nasty appearance of the rubber solution which often ran into the jars, the difficulty of opening which was done by turning the jar upside down allowing the neck to remain two minutes in hot water so as to melt the rubber and allow the removal of the glass stopper, then the impossibility to process the jars at higher temperature than 212° (boiling water).

The Mason Jar was the next step. The sealing in them being obtained by a rubber ring on which rests and impresses the lower part of the cover with screw-formed flange, and made of zinc. The neck of the jar being also formed in a screw, the sealing was obtained by screwing the cover by hand as tightly as possible. The screwing is not tight enough to allow the jars to be processed in closed retorts. Processed in plain boiling water it allows some steam to escape and by the vacuum created in cooling it makes the cap so tight as to make its unscrewing impossible, the difference of expansion of the metal and of the glass by action of the heat and the difference of contraction when cooling off, still increasing the adherence of the cover and making the opening impracticable. Gordon & Dilworth, of New York, in making a glass top held by a cleverly devised spring clamp have greatly contributed to the progress in this line. This improved closure has enabled them to produce a higher grade of products securing the good name and reliability of their brand.

This closure, however, does not allow to process the jars under pressure in closed retorts, the opening is rendered easier, but the rubber ring is still in contact with the goods.

AIR ENCLOSED IN CANS AND JARS.

The mistaken idea that the air is responsible for the spoiling of the goods has caused great deception to those who, not following the progress of modern science, hoped to secure the keeping of eatables and prevent their decaying by creating a vacuum and relying on atmospheric pressure to seal the jars. The slightest chemical reaction of the enclosed organic products or expansion by the heat, causes the rupture of the vacuum and the breaking of the air tightness of the seal.

The aim in sealing a jar is as much to prevent its contents escaping as to prevent outside elements penetrating into it. If the closure of the jar is such as to allow part of its contents, air or steam, to escape under the pressure produced by the expansion caused by the heat, by the same reason in cooling off the atmospheric pressure will cause particles of air to penetrate into the jar. Each of these particles, however, small it may be, contains germs, ferments, which will cause the fermentation or spoiling of the goods.

PROCESSING AT HIGH TEMPERATURE IN GLASS JARS.

This important problem has been solved by the Phoenix Cap which seems to realize all the desiderata of the preserver and of the consumer and at last placing the canning in glass on a practical footing.

At the risk of being accused of advertising a patented article, I will describe the work of this device. Constructed in full knowledge of the laws of physic, it belongs to this work, not only on account of the interesting results reached from a scientific point of view, but for the material benefit of those in search of a much-wanted air tight seal.

Its constitutive elements are a cover which fits the neck of the jar or bottle and is a perfect lid to it; this cover is enclosed

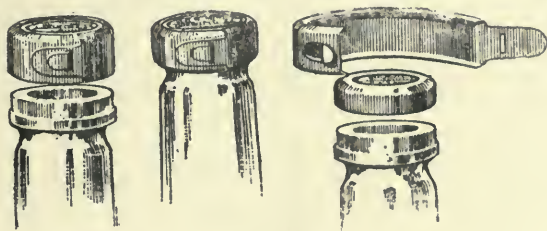


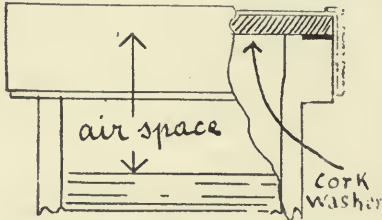
Fig. 5.

in a metal band which covers its flange, the top of the ring having itself an inward projecting flange holding the cover. Inside is the washer of compressible material. The principle involved is not only the happy perfect combination of these three items but their application.

The compressible washer employed is, of course, of such nature as to suit the kind of goods packed; it is either cork, rubber or cardboard.

FRUITS IN GLASS JARS—SEALING.

If the goods to be packed are fruits, per example apricots, they are placed in the jars, covered with syrup up to one inch from the very top and the cap placed over it. The machine



g. 6.

Jar Finish No. 4 covered with cap lined with cork.

especially constructed for the purpose will, in two seconds, operate the sealing. The first action will compress the cap on the jar by the pressure of a 600 pounds spring. This compression squeezes the washer on the top of the jar reducing it to 1-3 of its original thickness, the lower edge of the metal ring will therefore reach lower and be below the level of the groove under the rim of the jar. At this moment the machine resuming its work, flanges this lower part of the metal ring under the rim of the jar at a right angle. The cap is then set, it has a solid grip on the neck of the jar and holds it as firmly as if it were a precious stone, but of quite unusual size.

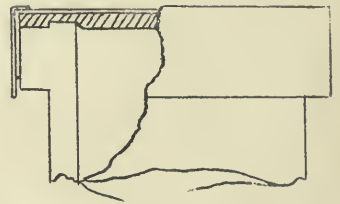


FIG. 7.

Jar Finish No. 4 covered with cap and under pressure.

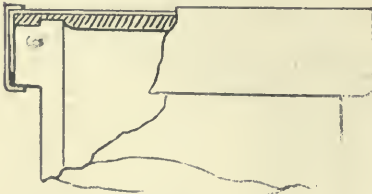


FIG. 8.

Jar Finish No. 4 covered with cap showing sealing made while pressure was applied.

Releasing the heavy pressure exerted by the machine will bring no change whatsoever. The setting under the rim is solid, it does not give and will hold the compression of the washer as tightly as if the pressure was still there.

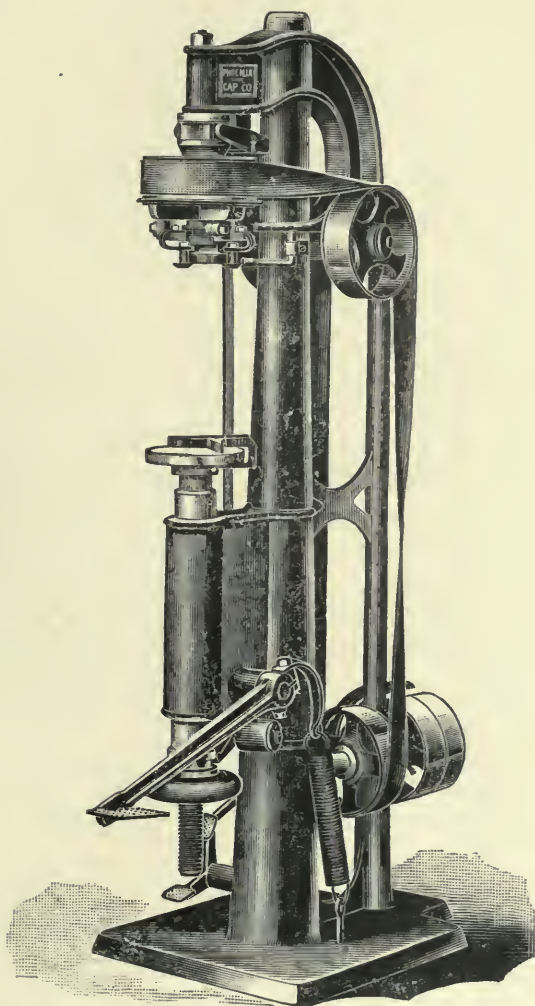


FIG. 9. Phoenix Jar and Bottle Sealing Machine.

The jar is then placed in the water bath, and processed for the required length of time to insure the keeping of its contents. If the processing is made in closed retorts, under pressure, the work is the same; it also matters not whether it is a water or steam retort.

When processing under high temperature, the length of the processing is shortened for the mere reason that a heat, say 225°

Fahrenheit, around the jar will, in the same length of time, transmit a greater amount of heat to the inside of the vessel than a temperature of 212° (boiling water) would. All we desire is to have this heat reach not less than 180° in the very heart of the fruits contained in the center of the jar.

In this example the inside of the cover was lined with a cork washer. This lining is the most proper for fruits which are processed, but owing to the vegetable nature of the cork which is liable to contain mold and also to increase its elasticity and remove the dust, these washers should always be soaked in hot water before being used; they must not be boiled as this would soften them too much and therefore decrease their elasticity.

The neck of the jar (see fig. 6, 7, 8), has a peculiar shape on the top and it has great importance. The top edge is flat or ground and does not exceed 1-32 in height and leaving the groove all around perfectly smooth. The compression is progressively applied on the jar covered with the cap when sealing. First the top edge forces into the cork washer forcing the cork on the side. The pressure increasing, the washer finds itself squeezed between four walls formed on one part by the cover and its flange, on the other by the smooth surface and the top edge of the jar, it is then, when submitted to the full pressure, that the setting of the cap is made.

The cork adheres perfectly to the smooth surface and makes a tight joint, if it were ground it would never be air tight, as the cork, whatever pressure may be applied, will never fill all the irregularities caused by the grinding. The assemblage of these irregularities forms like a tissue of little channels, each one acting as a capillary tube causing natural suction and creating a leak.

The cork washer makes a fine seal. A parchment paper disc of same diameter as the cork washer can be placed in the cap after the washer is in; it will prevent the contact of the liquid in the jar with the cork.

SEALING ON GROUND SURFACE.

It is a mistaken idea that a tight sealing can be obtained on a ground surface, and it can be stated that every jar so finished

and not provided with a smooth groove leaks, has leaked or will leak.

SEALING WITH CAPS WITH RUBBER.

The cork being nothing else but the bark of a certain variety of oak there is a limit to the diameter of the washer that can practically be cut out of it. When the diameter reaches three inches, rubber rings are used as lining of the covers. These rings are of such width as to rest in the groove on the top of the jar

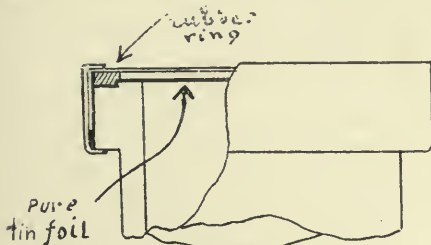


FIG. 10.
Jar Finish No. 4 sealed with cap, lined with rubber and pure tin foil.

and when the sealing is made this ring is practically encased between the bottom of the cover and its flange on one part and the groove on the other. The acid of the fruit attacks the rubber, and in order to prevent the contact a pure tin foil disc is first placed on the jar and then the cap. This tin foil disc is of same diameter as the inside of the cover.

However, some very acid red fruits attack the tinfoil, this having a tendency to make them turn purple. This is avoided by using a parchment paper disc instead of tin, but it is still preferable to use both the parchment covering the jar.

TEMPERATURE OF PROCESSING FOR JARS.

To process, and in order to avoid breakage, the jars should not be placed in hot boiling water, but warm water and raise the temperature progressively, taking about fifteen minutes to reach boiling. If the jars are to be processed at 212° Fahrenheit, this is to say in plain boiling water, start counting the time from the moment the water starts boiling. Maintain a slow boiling for the length of time required, then shut off the steam allowing the jars to stay in the water at least twelve minutes in order to allow them to cool off gradually. Should they be taken out of the hot boiling water, the glass is liable to crack if there is a cold draft in the room.

If the processing is to be made under pressure in closed retort, it can be in either water or steam.

If in water it should be slowly brought to boil, raised pro-

gressively until the required temperature is reached when the time is taken marking the beginning of the length of processing to be given.

Remember that the jars are air tightly sealed, the contents cannot escape, neither can the water of the bath penetrate into them; it therefore requires some special care. I have already stated that the raising of the temperature must be made slowly, slower yet must the lowering be made. During the processing there is a certain pressure corresponding with the degree of the temperature reached, the higher the temperature the greater the pressure, but whatever the temperature maintained in the kettle may be, the inside of the jar which does not receive a direct but transmitted heat will not be at, nor reach, as high temperature as there is in the kettle, therefore the pressure inside of the jar will be lower than the pressure outside, consequently there will be no danger of bursting. However if, when the required time for processing is over, the steam is all of a sudden shut off, and the pressure in the retort allowed to drop to atmospheric pressure, the pressure inside of the jar not being effected remains the same and the body of the jar which was under an outside pressure will find itself suddenly under a great inside pressure, this producing a shock which is more than liable to burst the jar. If the pressure in the retort is lowered slowly there is no danger of bursting whatsoever. For the same reason, if by neglect the processor has allowed the retort to reach a pressure much greater than desired, there will be no harm done provided the pressure is brought back to where it should be, but this must be done slowly in two or three minutes.

All the above refers also to the processing of the jars in steam bath, but in this case, there being no water, the jars are directly heated by the steam; great care should be taken to heat slowly, especially at the start.

In fact, in processing glass jars either in water or direct steam, sudden variation, increase or decrease of pressure or temperature must be avoided.

When the total loss in sealing and processing exceeds in the whole two per cent. there is a fault and it should be remedied at once, and the manufacturer should only consider himself satisfied when the percentage of the loss is reduced to one per cent.

JAMS IN JARS SHOULD BE SEALED.

If the jam is semi-liquid the jars should be sealed with caps lined with cork washers and processed for one hour; however, the average jams and jellies will keep by themselves if the jars are sealed hot.

Jams and jellies are sold at a very low price, and in order to reduce the cost of the sealing of the jars to a minimum, they are sealed with caps lined with composition washers or cardboard, the contact of the goods with the washer being prevented by a disc of either parchment or wax paper. The cardboard not being as compressible as cork, the jars must in this case have a finish a little different than the previous description. The total height of the rim of the neck remains the same, but there is no groove; the top can be either ground off when the jars are blown, or smooth when the jars are machine-made, same as manufactured by the Hazel Glass Co., of Washington, Pa.; the C. L. Flaccus Glass Co., of Pittsburgh, Pa.; Ball Brothers Glass Manufacturing Co., of Muncie, Ind.

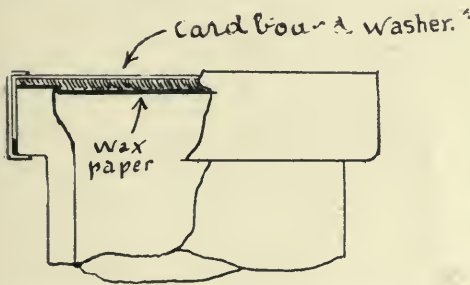


FIG. 11.

Jar Finish No 2 for Jam, Jellies, Pickles sealed with cap lined with cardboard and wax paper.

Jars sealed with caps lined with composition or cardboard washers cannot be processed.

BOTTLING OF FRUITS IN BRANDY.

Fruits in brandy and other similar goods, which are not processed, should be sealed with caps lined with water-proof cork washers. These corks have great elasticity and being water-proof they constitute the best seal for this line of goods, as no evaporation of the spirit can take place; the jars should have the regular cork finish, No. 4. (See Fig. 6.) However, for cheap goods, which are, of course, not processed, the cap lined with cardboard washer can be used; in this case the jar should have finish No. 2. (See Fig. 11.)

PACKING VEGETABLES IN GLASS.

Vegetables, after they are blanched and cooled off, are put up in the jars, dipped cold, and allowed to stand fifteen to twenty minutes before sealing, this on account of the vegetables absorbing some of the brine. After this time refill your jars up to one inch from the top. The jars are sealed with caps lined with rubber rings and tinfoil, the latter to prevent the rubber from coming in contact with the salt water. The jars are then processed same as described for the fruit in glass jars. (See Fig. 10.)

The reason for leaving one inch empty space on top of the jars, and this applies as well to the fruits and other goods containing liquids, is that the water is very little compressible. During the processing the water will be heated and expand. If the jar was full of a cold liquid the expansion, not being able to find room, would have such strength as to burst the jar. By leaving one inch, this space is occupied by the air, which is very compressible, and will give under the pressure of the liquid expanding, allowing room for it, and the jar will not burst.

AIR SPACE ON TOP OF THE JARS.

Experience has taught that one inch is the proper room for the expansion of a pint jar having an outside diameter of the neck of 2 1-4 inches, 1 1-2 inches for quart jar with same neck, but reduced to 1-2 inch for pint jars with 3 inches diameter and 1-2 inch for quart with 3 1-2 inches of the neck.

Dipping the jars too full is often the cause of large breakage, which can be very easily avoided.

Glass jars must not be cooled off suddenly after processing, it would only cause an enormous breakage without gaining anything. This cooling off is of no use whatsoever. It does not destroy ferments; it is the heat that does that; it does not prevent the spores, which are not destroyed from germinating; it is the two or three per cent. of salt contained in the brine that does it.

When processing jars in either water or steam, it matters not whether the jars are lying down flat, or in an upright position, or are upside down, they are to be disposed so as to process as many jars as possible in one operation.

PRESERVING VEGETABLES.

Imported and Domestic Manufacture—The Use of Copper for Green Peas.

This is one of the most important branches of canning, enormous quantities of vegetables are prepared every year, but very few have merits. The vegetables must not only taste good, but have an attractive appearance. For the best protection of the public, a campaign has been made against the use of sulphate of copper for peas, string beans, etc., not because it is a dye used to artificially color the goods, but because there are men who call themselves preservers who have misused the sulphate of copper or employed substitutes which would undoubtedly have caused fatal accidents. However, the fact that I, with all sensible canners, condemn the use of chemicals in connection with food products does not involve that we should all sing the same chorus and repeat again the old story of the misdoing and the evils of the copper. We might just as well be honest about it; the prohibition of the sulphate has stopped the importation of European goods which are all green, it has forced the domestic products on the American public. But now that Americans control the trade, it would be just as well if not better that the goods be treated properly so as to make them remain as natural as possible, not only in taste, but in color.

NATURAL AND GREEN VEGETABLES.

BLANCHING OF VEGETABLES.

When, a few years ago, canning was still in its infancy in the States, the vegetables were merely put raw in the cans, covered with water and sealed, allowing a vent hole. After about thirty minutes cooking, the vent was sealed and the processing resumed. The products prepared were mushy and of no engaging appearance; were they peas, to color them sulphate of copper

was added to the brine, but this would not make them green; then the proportion was increased, and still increased, and no other result was obtained than seriously tampering with the health of the consumer.

The sulphate of copper absorbed in large quantities is poisonous, but when in quantity small enough to cause only a slight indisposition, it gives the products to which it is added such a bad and disgusting taste that it is utterly impossible to swallow them. It has such a repulsive taste that it would cause an intended suicide to change his mind before having absorbed enough of the chemical.

The sulphate of copper is not a dye, it is a mordant; it merely fixes the natural green color of the vegetables; if the peas or the string beans are over-ripe, turning yellow, the sulphate will not make them green again. When there is no green color to be fixed, it cannot fix any. If the vegetables have been heated by the fermentation, in other words if they are not canned as soon as picked and they begin to decompose, causing their color to fade, they will not regain the green they have lost, neither will the sulphate make them green again.

In fact, if you have not first-class peas, do not attempt to fix the green; if you have fresh young peas, I consider it would be a crime not to retain this tender green color when it is so easily done.

Of course, to the canner who packs peas that come from far in the country, and which are only packed 68 hours after they have been picked, it will be policy to fight against the green article which he cannot produce.

The consumer quickly learns that such goods look fine and taste good; they taste good because they look fine, and they look fine because they were fresh and green when packed, their color has been fixed and it is there yet. It is the undeniable proof of the soundness of the pack.

The sulphate of copper is no paint nor disguise; if there is in the batch an over-ripe pea, it will remain yellow; if it escapes the eye and finds its way in a can, the consumer will find the difference by himself; he will soon learn that this frightful copper is in fact his best friend, the faithful detective that will point out the unsound and therefore unpalatable.



FIG. 12.
Tinned Copper Kettle, with per-
forated basket for blanching
all kinds of fruits and
vegetables.

The conserve manufacturer is not a druggist; it is not part of his trade to sell copper salts, but there is no reason why he should not use the advantages offered by the sulphate of copper so long as he delivers to the trade goods which are perfectly sound. The green color of the vegetables is fixed by the following process:

When the water, in which the vegetables are to be blanched is boiling, add to it the salt and the required quantity of sulphate, about one ounce to each twelve gallons of water. Throw the vegetables in this bath, allowing them to boil until they are softened.

Hoist the perforated, tinned copper basket containing the peas or beans and lower it in the cold water tank, stirring to cool as quickly as possible, and let cold water run to renew the bath; it will remove all the sulphate.

When cold, can or bottle, dip with hot or cold brine, seal airtightly and process. Jars or bottles filled with vegetables and cold dipped should be allowed to stand fifteen minutes after dipping as they absorb a certain quantity of the brine and it is afterwards necessary to refill them. The sealing of the bottles is to be absolutely airtight and a pure tinfoil disc must be used to prevent the contact of the brine with the rubber lining of the Phoenix Cap, the rubber being decomposed by salt water. The caps lined with cork washers cannot be used for vegetables as the tannic acid of the cork would cause the vegetables to turn yellow.

All the vegetables (with the exception of corn, for which it should also be done) are blanched before canning. For this they are merely thrown in boiling water

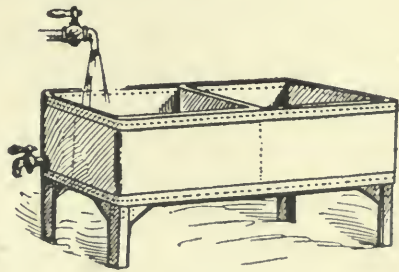


FIG. 13.
Tank with cold running water to cool off fruits and
vegetables after the blanching.

and boiled until softened; thrown in cold water will harden them again, and allow packing without damaging them.

The blanching has not only the effect of washing off and destroying all the germs which have accumulated on the surface of the vegetables, but also the ferments and molds which have already secured a foothold in some parts. It removes the excess of acids, freeing the vegetables of their crudity or raw taste. It also dissolves the mucilaginous matter which is so readily attacked by the *bacillus lactic acid*i and favors the development of the *bacillus butyricus*.

If some fermentation has already taken place, the removal of the mucilaginous matter will, at the same time, drive away the minute organisms which were attacking it.

An insufficient blanching fails to remove all the soluble mucilage and whatever remains will be dissolved by the brine when processing, and cause the liquid to be cloudy and slimy. This is often and unduly blamed to the *bacilli viscosi*.

PEAS.

Blanching, Canning, Processing.

All varieties can be canned, but a poor grade will never produce a fair quality of goods. The main thing is to have fresh peas; thirty-six hours after they are picked they are not suitable any more for good products. The fermentation sets in peas very quickly; it develops heat soon followed by full decomposition. In order to avoid fermentation, the peas left at the end of the day's work should be stored over night in a cool, well-aerated place and spread over the floor, avoiding too thick a layer.

The peas are shelled and sorted to size by machinery, then "blanched" until softened and cooled off in cold running water. The addition of one ounce of sulphate of copper to the blanching bath will fix the green color of the peas. ✓

The blanching kettle (Fig. 12.) should have a capacity of twenty gallons. Pour in ten gallons of water and as soon as it starts boiling add a handful of common table salt, and when dissolved throw in the peas, stirring continually and skimming, in this way separating all the dust.

Blanching requires more or less time according to the size and variety of peas, as well as the season, the fair average is as follows:

Extra fine,	5 minutes
Fine,	6 "
Medium,	8 "
Large,	10 "

BRINE FOR CANNED PEAS.

The brine should be made hot and can be used hot or cold. A good brine is made in dissolving common salt in boiling water.

Water,	25 gallons
Salt,	2 quarts (measure)

It should mark 2 to 3° Beaume when cold.

SWEET BRINE.

The sweet brine is composed of

Water	25 Gallons
Salt,	4 lbs.
Crystallized sugar	4 "

Some manufacturers flavor the latter by boiling it a few minutes, adding one pound of sliced onions and four heads of lettuce cut in pieces.

The brine as soon as boiled should be passed through a white flannel, in order to separate all the dust it may contain.

If the peas are exceedingly farinaceous and forming a sediment at the bottom of the cans or jars, this will be prevented by the addition of 1-3 ounce of carbonate of soda to each ten gallons of brine.

If the green color has been fixed with the sulphate of copper, process as follows:

CANS.	Pints	10 min. at 236 Fah.
	Quarts	15 " " " "
	Gallons	25 " " " "

OR

Pints	12	"	"	232	"
Quarts	17	"	"	"	"

Jars sealed with Phoenix Caps, process same as the cans at 232°

For big marrowfat peas the processing should be increased by two minutes at 236° or three minutes at 232°

If the peas have been blanched without addition of sulphate of copper, process as follows:

Cans or Jars.

Medium	{	Pints	16 min. at 236 Fah.
&		Quarts	20 " " " "
Large		Gallons	30 " " " "
Fine &	{	Pints	13 min. at 236 Fah.
Extra fine		Quarts	17 " " " "

Always allow the glass jars to cool off a few minutes in the retort before taking them out.

STRING BEANS.

String beans are packed whole or cut; however they are prepared in the same manner; they are blanched, cooled off in cold running water, put up in cans or glass jars same as the peas. They are covered with salt brine, sealed airtightly and processed.

String beans are quickly softened by the blanching, which is therefore very short; the average is:

For	Extra fines	1½ minutes.
	Fine	2 "
	Medium	2 "
	Large	3 "
	Schnittbonen	1½ "

The brine penetrates the beans easier than it penetrates the peas, and therefore requires less salt. A good brine will be obtained in desolving

Salt	2 lbs.
Water	10 gallons

boil two minutes, strain through a flannel and dip the cans or jars cold.

It is advisable to fix the color by adding one-half ounce of sulphate of copper to each ten gallons of the blanching water.

String beans are a poor field for the development of bacteria. This is a reason why a light salt brine can be used, and for the same reason only a short processing is required.

PROCESSING.

Process as follows:

Cans or Jars.

Pints,	6 minutes at 232° Fah.
Quarts,	12 " " 232° "
Half gallons	15 " " 232° "
Gallons,	15 " " 236° "

GENERAL RULE FOR PROCESSING VEGETABLES.

As a rule for vegetables, the processing can be shortened or made at lower temperature when the blanching is lengthened. In reference to the string beans, if the variety packed is very young and tender, they should be thoroughly blanched and the processing done for the above given length of time but at 224° Fahrenheit only.

After processing, cool off the cans and allow the jars to cool off slowly.

In the States there is no rule as to the quantity of string beans required in each can or jar. The imported article is regulated at eight ounces of beans for the pints, and sixteen ounces of beans for the quarts.

LIMA BEANS.

CANNING IN TIN AND GLASS.

Very few canned lima beans are good; this is most likely due to the quality of the beans themselves. Young green beans blanched for fifteen minutes in water, cooled off in running water, packed in cans or jars, dipped with cold brine, airtightly sealed and processed, would constitute a high class preparation. The brine should have two to three per cent. of common salt. A little carbonate of soda should be added to ripe beans so as to keep the liquor clear.

PROCESSING.

The processing should be:

Small beans	Pints,	20	minutes	at	230°	Fah.
	Quarts,	25	"	"	230°	"
Medium and						
Large beans,	Pints,	20	"	"	236°	"
	Quarts,	25	"	"	236°	"

Common goods are put up directly in cans, hot dipped, exhausted 12 minutes and processed 40 minutes at 240°. All the mucilaginous matter remains in the cans the contents of which are always mushy owing to the length of the processing. The pack in glass should always be blanched, and in all cases care should be given not to fill the cans too much as the beans swell while processing.

ASPARAGUS.

BLANCHING AND CANNING.

Asparagus is difficult to pack and it nearly requires to be such a master in the art as R. Hickmott, of San Francisco, to turn out quantity and quality.

Round and square cans as well as glass jars are used.

The asparagus is first scraped and carefully sorted by size, notwithstanding its length, then cut all the same size as the length of your cans or jars and wash in cold water.

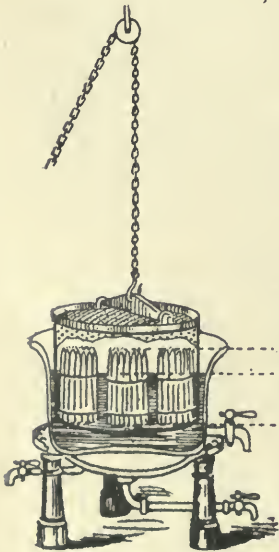


FIG. 14.

Place the asparagus, standing head up, in the perforated or tinned wire basket of the blancher and as soon as the water boils lower the basket into the water so that only 1½ to 2 inches of asparagus will be in the water, boil three to four minutes, then lower the basket so that about two-thirds of the asparagus will be in the water, boil three minutes more, after which time lower totally the basket giving one minute full boiling. Cool off in cold running water, the longer the better, but not less than thirty minutes. Can or put in glass jars and dip cold with brine made of



Salt,
Water,

4 lbs. 2 oz.
20 gallons

This brine should be boiled and cooled off before use. The water in which the asparagus is blanched should contain one-half lb. of salt to each twelve gallons of water.

PROCESSING.

Process:

Two-pound cans,	45	minutes	at	212°	Fah.
Four-pound cans,	55	"	"	212°	"
or Two-pound cans,	12	"	"	238°	"
Four-pound cans,	15	"	"	238°	"

The cans should be cooled.

For glass jars sealed with the Phoenix Caps give five minutes less processing than for cans at 212° or 240° Fah., allowing the jars to cool off gradually for 15 minutes.

ASPARAGUS TIPS.

Asparagus tips are made of white or green grass.

The white grass is prepared same as the canned asparagus, the blanching being reduced to two minutes, same brine and processing.

For the green grass add one ounce of sulphate of copper to each eight gallons of the blanching water in order to fix the green color.

If the tips are too soft after being blanched and cooled off, let them stay one hour longer in cold water adding to same one ounce of alum per eight gallons of water.

CARROTS AND TURNIPS.

BLANCHING AND PROCESSING.

Carrots and turnips are fine vegetables; they should be put up early in the spring and only hot-bed growth used.

Scrape with a knife and blanch in light salt water until the fork pierces through them easily. Refresh in cold water, put in cans or jars covering with the following brine:

Water,	20 gallons
Salt,	6 lbs.
Sugar,	6 "

These are fancy goods and only put up in pints and quarts, cans or jars, both are submitted to the same processing.

Pints,	20 minutes at 235° Fah.
Quarts,	27 " " 235° "

CELERY.

BLANCHING AND PROCESSING.

The celery must be tender and white; leave whole, cutting the stems of the height of the cans. Blanch in salt water until easily pierced with a pin.

Salt,	8 ounces
Water,	4 gallons

Put up in cans or jars and brine with

Water,	4 gallons
Salt,	1½ lbs.
Bay leaves,	6 oz.
Mace,	4 oz.

Process:

Cans or Jars.

Quarts,	18 minutes at 235° Fah.
½ gallons,	26 " " 235° "

or in open bath.

Quarts,	75 minutes
Half gallons,	2 hours

TOMATOES.

WHOLE TOMATOES.

CANNING AND PROCESSING.

They must be selected of proper size to go into the cans or jars Place them in lukewarm water containing a handful of salt

to each twelve gallons of water, bring slowly to a boil, picking the tomatoes with the skimmer and plunging them in cold water. Can and dip with cold brine.

Water,	20 gallons
Salt,	4 lbs.

Process cans or jars.

Two-pound,	8 minutes at 235° Fah.
Three-pound,	10 " " 235° "
or	
Quarts (two-pound),	16 " " 212° "
Three-pound,	20 " " 212° "

Packed in jars, air tightly sealed with the Phoenix Cap, it makes a beautiful package.

CANNED TOMATOES.

Scald and peel the tomatoes, packing solid in cans or jars. Seal and process promptly.

Pints,	6 minutes at 235° Fah.
Quarts,	8 " " 235° "
Three pounds,	10 " " 235° "
or	
Pints,	14 " " 212° "
Quarts,	18 " " 212° "
Three pounds,	25 " " 212° "

If okra is mixed with the tomatoes, the processing must be made at 235°. The okra must be blanched first.

NEW POTATOES.

CANNING, PROCESSING.

Shake the potatoes in a common bag with a handful of rough packing salt; this will remove the skin; wash quickly in cold water, and blanch one to two minutes in boiling water as follows:

Cool off in running water, can and cover with

Salt,	1½ lb.
Water,	4 gallons
Alum,	½ ounce

Process:

Pints,	15 minutes at 232° Fah.
Quarts,	18 " " 232° "
½ gallons,	22 " " 232° "

Cool off the cans.

CORN.

PACKING AND PROCESSING.

Corn ears should, same as all other vegetables, be blanched; this is to say, boiled for 15 minutes in water with a handful of salt—then the ears should be passed through the corn cutter and the packing done without use of cookers—but merely a filler, the jars or cans should be dipped hot with

Water	20 gallons.
Salt	1 lb. 4 oz.
Sugar	2 lb.

seal airtightly and process cans of jars

Pints	30 minutes 235°
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By the actually in use methods the corn is cooked in special apparatus known as "Corn Cookers," and live steam is in direct contact with the pulp of the corn.

If sulphite of soda is added it should be in a very small quantity, but I do not advise it except in superior qualities having a tendency to discolor during processing.

The success lies in having a good cooker and not running it at too high speed; the processing offers no difficulty, whether done in cans or glass jars.

After sealing air tightly, process:

CANS.

Pints,	60 minutes at 244° Fah.
Quarts,	85 " " 244° "

JARS.

Pints,	50 minutes at 235° Fah.
Quarts,	65 " " 238° "

Allow 15 minutes for glass jars to bring pressure back to atmospheric pressure.

MUSHROOMS.

RAISING MUSHROOMS.

The home production is quite small and I could nearly say that were it not for E. C. Hazard, of Shrewsbury, N. J., these would all be imported.

Mushrooms are raised in beds, in cellars especially built for the purpose. In Paris, France, they are extensively cultivated in the old "Catacombs" (underground stone quarries), they are no other than the white argaric and spontaneously grow on horse-manured lawns when conditions are favorable.

Practically the mushrooms will grow in any building provided no light or draft be allowed to interfere with their growth and the beds can be made on the floor or on shelves.

Make a layer of about twelve inches of horse manure without straw and every ten inches apart make a small hole in which place a piece of mushroom spawn. Cover the holes with manure and cover the whole bed with not over two inches of light, black sandy ground.

Water every week with a florist watering can, do not use more than a pint per square yard, this water being about 70° Fahrenheit and prepared as follows:

Water,	1 gallon
Saltpetre,	$\frac{1}{4}$ ounce

After the bed has started to produce, the mushrooms can be picked every day for about five months, sometimes longer, until it is "exhausted." Then tear off the beds saving the spawn which you will use for the new beds.

Experience proves that the mushrooms grow best when the inside of the bed is kept at a temperature of 105 to 115° Fahrenheit, thus maintaining the beds at that temperature by a system

of hot water pipes as existing in Shrewsbury which enables to produce winter and summer.

Special care is to be taken in picking the mushrooms not to break the fibres from which they sprout. For this take the mushroom with the hand and turn it gently as if to screw it; it will break easily without disturbing the plant. The atmosphere of the mushroom house must always be moist; if allowed to be dry it will greatly injure the beds.

CANNING.

The mushrooms are picked when small and before the umbrellas open and packed with water in cans or jars, the imported article is of several grades.

1° Extras, small and even mushrooms.

2° First Choice, which is the standard.

3° Galipettes or Hotel grade which contains all the broken, irregular and open mushrooms.

Peel the mushrooms and throw them in a bucket of water containing

Water,	2 gallons
Sulphite of Soda,	$\frac{1}{4}$ ounce

BLANCHING.

Blanch in boiling bath made as follows:

Water,	5 gallons
Salt,	2 lbs.
Alum,	1 oz.
Citric acid,	$\frac{1}{2}$ "
Bisulphite solution,	$\frac{1}{2}$ "
Juice of six lemons.	

The bisulphite solution is prepared as follows:

Water,	1 gallon
Bisulphite of soda,	6 ozs.
Chlorhydric acid,	7 "

Dissolve first the bisulphite in the water, then add the acid. As soon as blanched, which requires about four minutes,

the mushrooms are cooled off in cold running water, then put in cans or jars and covered with brine as follows:

Water,	5 gallons
Salt,	$\frac{1}{4}$ lb.
Bisulphite solution,	1-8 oz.
Citric acid,	1-3 "

Some manufacturers prefer to brine with 2 per cent. salt water.

PROCESSING.

Process:

Cans or Jars.	
One-half pints,	13 minutes at 230° Fah.
Pints,	16 " " 230° "
Quarts,	20 " " 230° "

This way of preparing the mushroom has been used for many years and is reliable.

CAULIFLOWER.

BLANCHING AND PROCESSING.

Califlowers are put up in cans or glass jars. Blanch in hot water (water, 10 gallons; salt, 4 ounces); for three minutes, cool off in running water and can in tins or glass. Brine with:

Water,	25 gallons
Salt,	4 lbs.

Process:

Pints,	17 minutes at 230° Fah.
Quarts,	20 " " 230° "

Or in boiling water three times longer.

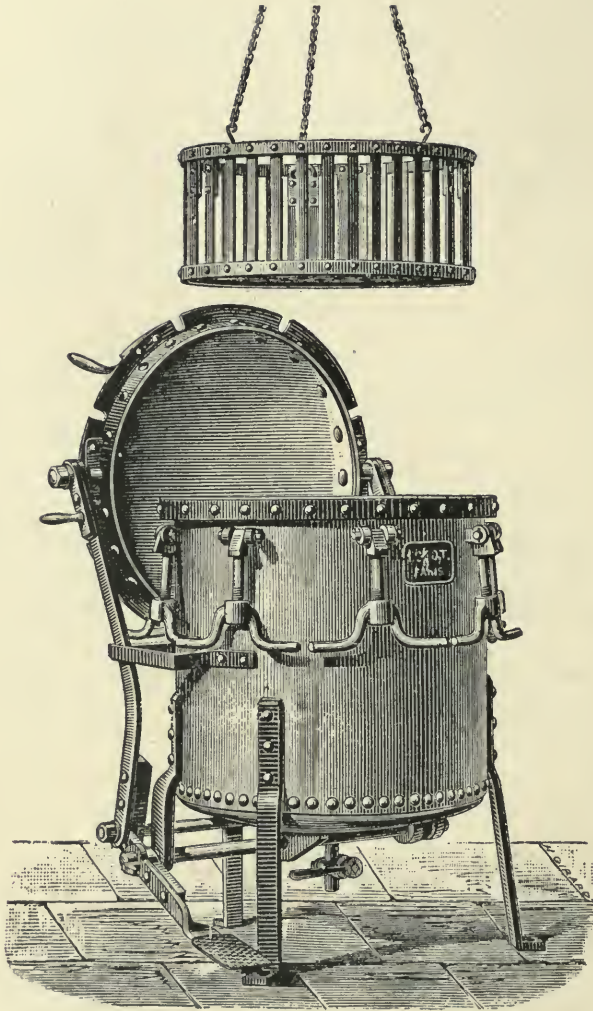


FIG. 15.
Kettle for processing at high temperature with either
steam or water.

BRUSSEL SPROUTS.

CANNING.

Same as cauliflower. Add one-half ounce of sulphite of copper in the blanching water (one-half ounce copper to 12 gallons water).

Same processing as cauliflower.

SPINACH.

Spinach is put up either whole leaves or chopped, the latter being preferred, it should be prepared in the spring when tender. Wash in cold water and blanch for six minutes in hot boiling water containing two ounces of sulphate of copper to each twenty-five gallons of water, and cool off in cold running water. Can, dip with same brine as used for cauliflowers, or, after blanching, chop the spinach, add salt to taste, put in kettle and bring to boil, can hot and process:

Pints,	20	minutes	at	235°	Fah.
Quarts,	25	"	"	235°	"
Gallons,	50	"	"	235°	"

Or double time in boiling water.

SORREL.

Sorrel is prepared same as spinach.

ARTICHOKES.

Artichokes should be preserved in the States as they are in Europe; they are a real delicacy and their cost in Louisiana or California is extremely low. They are seldom put up whole, as a quart can could only hold one whole one, when it can easily hold three to four if cut in quarters. Whole or quarters are treated in the same way.

BLANCHING.

Cut the artichokes in four, throwing them in cold water containing one ounce of sulphite of soda per ten gallons of water to prevent them from turning black. Blanch the artichokes in this same water, adding one-half ounce of sulphate of copper to each twelve gallons of water to fix the green. After two to four minutes boiling, throw in cold running water to cool off. The artichokes must only be put in the blanching bath when same is boiling.

BRINE.

The blanching must not cook the artichokes, it would soften them too much and the leaves would not hold to the bottom. As soon as cooled remove the fibrous seeds with a knife and trim the leaves with scissors, put in cans or jars and cover with brine.

Water,	5 gallons
Salt,	1½ lbs.
Alum,	1 oz.

This brine must be made hot but used cold.

PROCESSING.

Process:

Pints,	12 minutes at 235° Fah.
Quarts,	18 " " 235° "
One-half gallons,	25 " " 235° "

Or four times longer in plain boiling water.

ARTICHOKE BOTTOMS.

The artichokes must be thoroughly blanched, but, by boiling in water, they are liable to break. This is avoided by placing them in water in a processing kettle, placing over them a heavy sheet iron plate and cooking for three minutes at 220° Fahrenheit. Shave the bottoms evenly with a knife, take off all the leaves and seeds by hand and place the bottoms in white willow baskets and plunge them in a kettle containing a solution of bisulphite of soda.

Bisulphite,	2 ozs.
Water,	6 gallons

Cook slowly for sixteen minutes and cool off in several changes of cold water.

Can in tins or jars. The bottoms being quite soft, it is customary to process in plain boiling water.

One-half pints,	50 minutes
Pints,	65 “
Quarts,	80 “

Avoid as much as possible, leaving the artichokes in contact with iron as this metal makes them turn black.

PUMPKINS.

Scald a few minutes and remove the rind with knives, grate and mash with the machines especially made for the purpose, putting the pulp in a kettle where it is boiled with a little water for ten minutes stirring continually.

Can hot and process:

Pints,	10 minutes at 235° Fah.
Quarts,	15 “ “ 235° “
Gallons,	25 “ “ 235° “

READY PREPARED VEGETABLES.

I have described the preparation of vegetables such as are found in nearly every grocery store.

The first thought of man is to insure his means of existence, to make a living and to make money. He then finds he needs a companion in life. Having his human needs and desires satisfied, he will think of comfort, refinement and art.

Such is also the case with nations. America's only thought was, first to fight for life, then for money. American women became champions of art. Refinement of taste had to follow the general rule, starting in the higher class of society and spreading rapidly.

But if many know how to appreciate a good thing, few know how to prepare it. I therefore believe that, by giving the preparation of ready cooked and seasoned vegetables, it will help some manufacturers who will, in return, be of great assistance to the public in general.

JUNE PEAS, FRENCH STYLE.

Do not blanch. Wash the peas in cold water and cook for one hour, with little water, in steam enamel kettle having a tight-fitting cover, with seasoning as follows

Butter,	2½ lbs.
Peas,	30 quarts
Salt,	1 lb.
The yellow of eight lettuce.	
Sugar,	1 lb.
Six peeled, small, whole onions.	

Can hot with the juice and process:

Pints,	20 minutes at 135° Fah.
Quarts,	25 " " 135° "

None better can be had at Delmonico's.

EARLY PEAS WITH HAM OR BACON.

These are prepared same as "Peas in French style," but after forty-five minutes cooking add a reasonable quantity of small slices of ham, cook thirty minutes more, can hot and process same as French style.

Bacon can be used instead of ham.

CARROTS IN BUTTER.

When canning the blanched carrots, cover with

Water,	5 gallons
Sugar,	2 lbs. 4 ozs.
Salt,	2 lbs.
Butter,	2 "

Boil five minutes and dip hot. Process same as carrots in water.

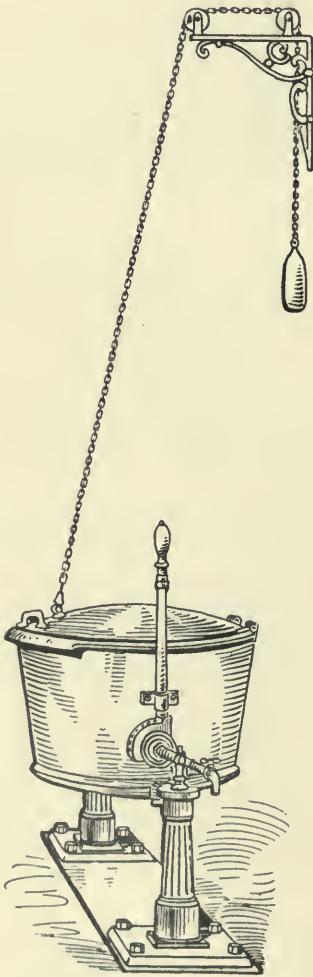


FIG. 16.

Kettle with cover for preparing ready cooked and seasoned vegetables and meats for canning.

TOMATO SAUCE.

Boil two hours in enameled kettle.

Tomatoes,	100 lbs.
Salt,	1 lb., 2 ozs.
Bayleaves	$\frac{1}{2}$ oz.
Cloves,	$\frac{1}{4}$ oz.
Onions,	3 lbs.

Pass through a thin sieve of perforated nickel, if possible.
The sauce must be thick; bottle, seal air tightly and process:

One-half pints,	15 minutes at 222° Fah.
Pints,	20 " " 222° "
Quarts,	30 " " 222° "

SPINACH WITH BUTTER.

Prepare as plain spinach, adding one ounce of salted butter to each pound of spinach, boil four minutes.

Can hot and process:

Pints,	20 minutes at 238° Fah.
Quarts,	25 " " 238° "

SORREL WITH BUTTER.

Prepared same as spinach.

MUSHROOMS IN BUTTER.

Melt butter in a kettle and as soon as it boils throw in the peeled mushrooms, boil five minutes, pick the mushrooms with the skimmer, can them tight covering with butter. Put new batch of mushrooms in the kettle, etc.

Process:

Cans or Jars.

One-half pints,	15 minutes at 232° Fah.
Pints,	20 " " 232° "
Quarts,	25 " " 232° "

However, the mushrooms, in my opinion, require spices to strengthen and back up their especial flavor, I would therefore favor the following recipe:

Cook in a flat bottom kettle on direct fire

Mushrooms (previously peeled),	5 lbs.
Water,	1 pint
Salt,	4 ounces
Medium size onions cut in large slices,	5 lbs.
Ground black pepper,	$\frac{1}{2}$ oz.
Parsley,	$\frac{1}{2}$ "
Garlic,	1 clove

Tied in a bunch.

Put cover on kettle and boil fifteen minutes, can in tins or jars tightly, pouring over one ounce of melted butter for the pints, two ounces for the quarts.

Process same as above.

PLUM PUDDING.

PREPARATION AND PROCESSING.

TINS OR GLASS JARS.

The plum pudding is made with butter or suet, the latter being preferred.

The grease is cut and hashed, then mixed with the flour, to which the bread crumbs had been added.

Mix the orange and lemon peels, cut in small slices with the raisins and the eggs. Knead the whole, adding the salt, lemon zest and grated nutmeg.

Suet,	1 lb.
Flour,	1 "
Bread crumbs,	1 "
Crystallized sugar,	$\frac{3}{4}$ "
Raisins (Corinthe currants),	$\frac{1}{2}$ "
Orange peel (candied),	$\frac{1}{4}$ "
Lemon peel (candied),	$\frac{1}{4}$ "
Pitted Raisins (malaga),	$\frac{3}{4}$ "
Citron (candied),	$\frac{1}{4}$ "

Medium size fresh apples grated,	2
Salt,	2 oz.
One-half of a nutmeg.	
Zest of one fresh lemon.	
Rum,	$\frac{1}{2}$ tumbler
Milk,	1 glass
Eggs,	6

The paste obtained must be firm and is immediately put up in tins or glass jars with Phoenix Caps lined with rubber rings and pure tinfoil discs. The tins or glass jars being processed without vent hole or exhausting of air.

One-quarter pound	2	hours at	222-223°
One-half "	2 $\frac{1}{2}$	" "	222-223°
Three-quarter "	2 $\frac{3}{4}$	" "	222-223°
One pound,	3	" "	222-223°

Larger size plum puddings are steamed, that is to say tied up in shape of a ball, in a buttered linen towel, boiled for six hours for a three-pound pudding, then allowed to cool off, put up in tin without water, processed thirty minutes at 225°. Cool off the tins with cold water. Glass jars are allowed to cool off for 15 minutes in the retort or process kettle.

TOMATO KETCHUP.

Crush and boil for one hour one bushel of tomatoes, press through a nickle sieve and put back in the kettle, boiling three hours longer, it must then be a heavy pulp.

Add:

Salt,	$\frac{1}{2}$ lb.
Sugar,	$\frac{1}{2}$ "
Special spices,	8 ozs.

and two quarts of strong vinegar in which one-half lb. of chopped shallots have been boiled for twenty minutes.

Boil the ketchup fifteen minutes more, bottle hot, sealing with the Phoenix Caps. Process the bottles in boiling water bath if you so desire.

TOMATO KETCHUP SPECIAL SPICES.

To prepare the special spices, mix and grind together the following:

Black pepper,	1 lb.	Cinnamon,	$\frac{1}{2}$ oz.
Dried red peppers,	5 ozs.	Coriander,	$\frac{1}{2}$ "
Cayenne pepper,	$\frac{1}{4}$ "	Thyme,	$\frac{1}{2}$ "
Grated nutmeg,	1 "	Bay leaves,	1 "
Cloves,	$1\frac{1}{2}$ "		

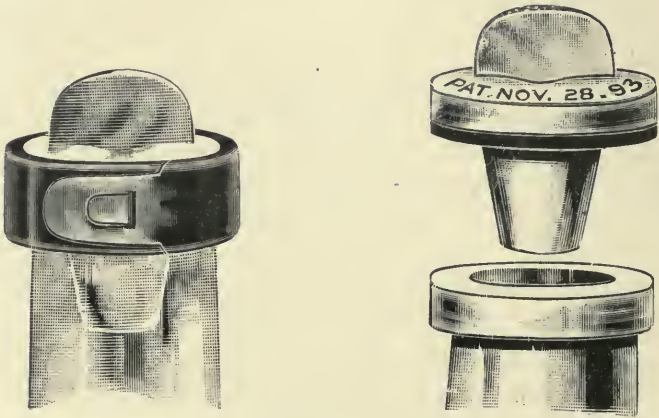


FIG. 17.

Especial air-tight glass sealing, allowing to process the bottles after they are sealed; glass stopper remains for use by the consumer.

VEGETABLES PRESERVED IN SALT.

The antiseptic power of salt is often used to preserve vegetables in barrels or stone jars; string beans, tomatoes, artichokes and cucumbers being among the leaders in this line.

The best method of preparing them is as follows:

STRING BEANS.

Blanch not over three minutes and cool off in cold running water for twenty minutes. Put in a barrel in layers, covering each with coarse salt, about one ounce of salt per pound of beans. Pack tight; when the barrel is nearly full cover with a piece of fabric, boards and a stone to press down. Pour over cold water which has previously been boiled. The water must totally cover the beans. Two days later drain the brine through the faucet and boil it, make sure it marks between ten to eleven degrees Beaume; should it be less add salt until it reaches this density.

When cooled off, pour back in the barrel. For shipment close the barrel, fill it with fresh, cold ten degrees brine through the bung-hole and cork up.

String beans put up this way keep easily for three years if stored in a cool and dark place.

If desired that they should remain green, add one-half ounce of sulphate of copper to each twelve gallons of water when blanching.

Before using salted beans, wash them a few hours in several changes of water.

CUCUMBERS IN SALT BRINE.

Pack the cucumbers in a barrel as tightly as possible covering each layer with salt. When full cover with board and place a stone to keep them pressed down and cover with cold water which has previously been boiled. Drain through the faucet two days later, reboil the water adding salt to maintain the brine at 10° to 11° Beaume. Repeat this operation several times if the brine does not keep its degree.

These cucumbers will keep very long and are used for pickling. (Put up in vinegar.)

ARTICHOKES.

The brine would have difficulty to penetrate to the heart of the artichokes; it is therefore necessary to take out the seeds.

With a large, sharp knife, cut the top of the artichokes about 1½ to 2 inches and with a strong spoon remove the small leaves from the middle and the fibrous seeds from the centre, this is to be done without injuring the bottom. Blanch five minutes in: water, twelve gallons, salt, eight ounces, and cool off in cold running water.

Put in barrels and cover with brine marking 12° Beaume cold. Once in a while test this brine; if it is below ten degrees drain, reboil it and add salt to bring it back to the proper strength. Should it be cloudy and greenish, throw it away and make a new one as it is partially decomposed.

Same as other vegetables the artichokes must be kept, by boards and stone, under the level of the brine. The barrels are also to be kept in a cool, dark place.

For use, soak them twelve hours in several changes of water, boil until properly cooked for the table.

CAULIFLOWER.

Blanch not over two minutes in boiling water containing six ounces of salt to each ten gallons and cool off in cold running water. Put in barrel and cover with 12° brine, drain and cover with new brine four days later; after this examine every two weeks to ascertain that the brine is not under 10°, should it be, drain and pour over new brine at 11° Beaume.

The blanching must not soften the cauliflower as it would be mushy in the barrels and could not be shipped. For use, soak for twelve hours in several changes of water and blanch in plain water.

TOMATOES.

Put sound, not over-ripe tomatoes in stone jars, cover with 12° cold brine that has been boiled previously. Hold the tomatoes down in the liquid with a board and a stone. Four days later drain and cover with new brine of same strength; cover the surface of the brine with a little salad oil—do not use oil that is rancid or of bad odor.

These tomatoes will keep for one year.

SULPHITE IN SALT BRINE.

Sulphite or bi-sulphite of soda added in the proportion of one ounce to each eight gallons of water, when preparing the salt brine, will prevent mold and fermentation.

PICKLING.

String Beans, Green Tomatoes, Cucumbers, Cauliflower, etc.

Pickling is a very simple operation. Take the vegetables from the brine, soak them one day in several changes of water. Drain, put in barrels or stone jars and pour over hot boiling vinegar. Ten days later drain this vinegar that has lost all its acidity and replace by new hot boiling one. The pickles are ready for bottling. In fact all the vegetables can be pickled by being merely put up in salt brine for a little while, then treated

as above. It is preferable to use strong vinegar in this case; after ten days drain, re-boil, and pour back in the barrel.

After the cucumbers, beans or other vegetables have been soaked in cold water for twelve hours they should be thrown in hot, boiling water containing one-quarter ounce of sulphate of copper per twelve gallons of water. Do not allow to boil as it would soften the vegetables, stir gently, and when they are green enough wash them thoroughly in water for several hours. Put in vinegar as above.

PICKLING RED CABBAGE.

Red cabbage does not require either blanching or putting up in brine. Shred like sauerkraut, put in barrel, and cover with strong, hot vinegar. Twelve days later drain, re-boil the vinegar, and pour back in the barrel.

When bottling, cover with fresh-boiled vinegar.

It is important that the cabbage should always be kept under the surface of the vinegar by a board and stone as weight.

PICKLING VINEGAR.

Any strong vinegar is good as long as it has no especial or disagreeable taste. A good flavor is given to the vinegar by merely adding a little sage. However, the best is to mix the spices with the vegetables and then pour the hot vinegar over. These spices should be for a jar containing twenty-five pounds of vegetables:

Small onions	$\frac{1}{3}$ lb.
Shallots	$\frac{1}{8}$ "
Thyme	$\frac{1}{8}$ oz.
Sage	$\frac{1}{8}$ "
Garlic	3 cloves.
Taragon	1 oz.
Black pepper in grains	1 "
Cloves	$\frac{1}{4}$ "
Bay leaves	$\frac{1}{2}$ "

MUSTARD.

The mustard seed contains two different oils, a fixed and fat oil, which is in the pit itself, the other volatile and essential, contained in the envelope of the seed. The fixed oil is sweet and can be compared to cotton seed oil; it is without taste and can be used for all purposes. However, absorbed alone at the dose of two ounces it is purgative and acts as castor oil. It freezes only at very low temperature and keeps great length of time before turning rancid; it is therefore suitable for oiling delicate machinery, clocks and watches.

The essential oil evaporates spontaneously at a temperature of 123° Fahrenheit; its odor is as strong and powerful as that of ammoniac gas, one drop on the tongue produces a great pain such as a burn and it is felt through the throat and the stomach, in the same time producing great inflammation of the eyes. It dissolves easily in water, vinegar, and burns with a large bright flame.

It is this volatile oil that gives the mustard its peculiar flavor and strength.

FRENCH AND ENGLISH PROCESS.

There are two ways of preparing the mustard flour, which, mixed with vinegar is the condiment of interest here.

By the "French process" the seeds slightly moistened by addition of a little water and finely ground in a mill, the flour obtained is directly used to prepare the mustard.

By the "English process" the seeds are first pressed and the greater part of its fixed oil (sweet oil) extracted, the dry pulp that is left contains all the essential oil; this pulp is ground and constitutes the English powdered mustard. The English mustard is therefore much stronger than the French, but the latter, containing all the sweet oil, is much softer and has a more delicate taste.

ENGLISH PREPARED MUSTARD.

English prepared mustard is merely English process mus-

tard flour mixed with light vinegar and a little salt; the addition of wheat flour is an adulteration.

GERMAN PREPARED MUSTARD.

Mustard flour,	10 lbs.
Strong vinegar,	10 qts.
Salted cucumbers,	5
Ground pepper,	5 oz.
Cloves,	$\frac{1}{2}$ "
Cinnamon,	$\frac{1}{2}$ "
Nutmeg,	$\frac{1}{2}$ "

Use "French process" mustard flour.

Boil the vinegar, add the mustard and spices, then add the cucumbers. Crush into liquid paste.

FRENCH PREPARED MUSTARD.

Mustard flour,	10 lbs.
Parsley,	5 oz.
Celery,	5 "
Taragon,	5 "
Chervil,	5 "
Salt,	2 "
Sugar,	2 "
Citric acid,	$\frac{1}{4}$ "
Salted anchovies,	4
Garlic,	2 cloves.

Add sufficient quantity of strong vinegar.

FANCY FRENCH MUSTARD.

Parsley,	4 oz.
Water cress,	4 "
Shalotts,	3 "
Celery seeds,	3 "
Cinnamon,	$\frac{1}{2}$ "
Cloves,	$\frac{1}{4}$ "
Nutmeg,	$\frac{1}{2}$ "
Pepper,	$\frac{1}{4}$ "
Thyme,	$\frac{1}{4}$ "

Crush and infuse two weeks in one gallon of strong vinegar, then add:

Mustard flour,	10 lbs.
Salt,	4 oz.
Olive oil,	3 "

Make heavy paste, then add vinegar to reduce to proper thickness.

IMPERIAL MUSTARD.

Celery,	8 oz.
Parsley,	6 "
Chervil,	6 "
Scallion, or shalotte,	6 "
Nutmeg,	$\frac{1}{2}$ "
Pepper,	1 "
Cloves,	$\frac{1}{2}$ "
Cinnamon,	1 "
Thyme,	$\frac{1}{2}$ "
Taragon,	$\frac{1}{2}$ "

Crush and infuse two weeks in one gallon vinegar, then add:

Mustard flour,	10 lbs.
Salt,	2 oz.
Olive oil,	4 "

Add necessary quantity of vinegar.

ANCHOVY MUSTARD.

Mustard,	10 lbs.
Parsley,	10 oz.
Pepper,	1 "
Sugar,	2 "
Citric acid,	3 "
Nutmeg,	$\frac{1}{4}$ "
Garlic,	2 cloves
Salted anchovies,	1 lb.
Vinegar,	quantity req'd

TOMATO MUSTARD.

Use English process mustard flour.

Mustard flour,	10 lbs.
Tomato pulp,	18 "
Salt,	6 oz.
Cayenne pepper,	$\frac{1}{8}$ "
Citric acid,	$\frac{1}{2}$ "
Vinegar,	quantity req'd

The tomato pulp must first be reduced by boiling to a very thick paste.

HORSERADISH MUSTARD.

English process:

Mustard flour,	10 lbs.
Grated horseradish,	7 "
Salt,	6 oz.
Pepper,	1 "
Vinegar,	quantity req'd

Originally the French mustard was made in equal parts of mustard, green grape juice and vinegar plus the tomatoes. In modern days the citric acid has taken place of the green grape juice, which was only obtainable during a short period of the year.

GREEN MUSTARD.

Parsley,	12 oz.
Pepper,	1 "
Cloves,	$\frac{1}{2}$ "
Taragon,	6 "
Bay leaves,	$\frac{1}{2}$ "

Crush and infuse in one gallon vinegar two weeks, then add:

French process mustard flour,	6 lbs.
Dark green vinegar pickled cucumbers,	10 lbs.
Salt,	4 oz.

Crush to make fine paste and add necessary quantity of vinegar.

FISH CANNING.

SARDINES.

Sardines are extensively put up in France, where this high-grade fish has practically no value, so abundant they are on its coasts.

In the United States small fishes of all kinds, but especially herring, are extensively canned in the State of Maine. They constitute the "American Sardines."

However, the various processes employed for canning sardines in oil applies to any kind of fish. The factory is to be right on the shore, and as soon as the fish is landed it is put in barrels and covered with 12—20 per cent. cold salt brine in which they are allowed to stay.

Seventy-five minutes in 12 per cent. brine, or

Fifteen minutes in 20 per cent. brine.

If the fish is small, this time should be reduced; if the average fish is of large size it should be increased proportionally. Small fishes are never of good quality; they are always over salted; this on account of the salt bath being regulated for the medium or average size. The fish is then placed on inclined tables, allowing the brine to drain; with a knife the heads are cut, the digestive organs pulled out, the wings cut and the tail trimmed. They are thrown in baskets, sorting them by their size, large, medium and small. Wash the fish by lowering and raising the baskets in a tank of sea water.

Dispose the sardines on trays which are superposed on trucks and carried to the dryer which is an enclosed space of the height and width of the trucks; several trucks can be placed in the dryer. At one end a large ventilator blows a strong hot air draft through the dryer; the skin of the sardines must be perfectly dry before removing them.

COOKING.

There are two ways to cook the sardines—frying in oil for high grade, steaming for low qualities.

FRYING IN OIL.

For quick work and to produce an even quality of goods the frying apparatus must be constructed especially for the purpose and composed of a square sheet iron box with a taper bottom. It is heated by two or three rows of steam pipes, which are at eight inches above the bottom, as per figure and a widely knitted fire screen forms the bottom of the frying apparatus above the steam pipes.

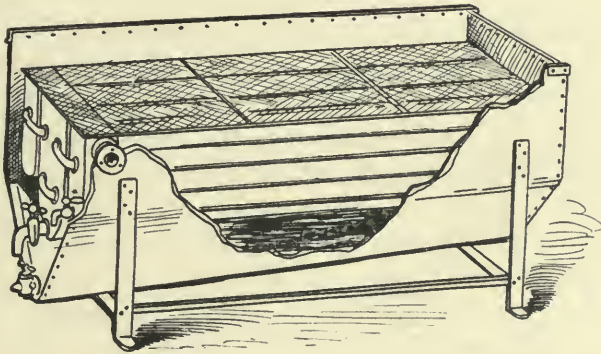


FIG. 18.

The oil is kept at proper temperature to fry the fish but not to burn or discolor it. The wire trays containing the sardines are lowered in the oil, and they rest on the wire screen bottom. As soon as some of the sardines rise to the surface of the oil they are properly fried; take the tray out and allow the oil to drain on an inclined table, the excess of oil dripping back into the frying bath.

Some particles of fish remain in the oil; they accumulate in the bottom below the steam pipes and do not mix with the next batch of sardines.

As soon as drained and at least partially cooled off the sardines are packed in tins, or glass boxes, covered full with oil and airtightly sealed.

COOKING IN DRY STEAM.

This is the quickest process, but it only produces second grades.

From the drying apparatus drive the trucks carrying the trays in a horizontal retort, close and bolt tightly the door, turn the dry steam on for about one and a half minutes, which is sufficient time to cook the medium size fish. Open the door of the retort, allow two minutes for the moisture to evaporate, and the fish is ready to be canned, covered with oil and airtightly sealed.

SARDINES IN GLASS BOXES.

Packing of sardines in glass boxes has been rendered not only possible but practical by the combined applications of the patents of the Phoenix Cap Company of New York in date of Nov. 28th, 1893, and Nov. 28th, 1899.

It is not only essential that the package be airtightly sealed and able to stand processing, but it must on the outside leave no space in which the oil can accumulate, turn rancid and give bad appearance to the package when opened.

The airtight sealing is obtained by placing on the box a flat blank of pure tin foil having exactly the shape as the top of the glass box; this tin prevents all contact between the oil and rubber of the cap; this is an essential feature, as the oil would dissolve and decompose the rubber.



FIG 19.

The cap composed of the cover and its band and lined with the rubber is placed on the glass box, over the tin foil, and while the sealing machine compresses the cover on the jar with a 1,000-pound pressure, the lowest part of the ring of the cap is set, turned over the rim of the glass box (fig. 19.)

PECULIARITIES OF CONSTRUCTION REQUIRED.

The other peculiarities in the construction of this package are the concave shape of the cover and the rim of the jar.

The cover is concave; viewed from the inside it is convex; (see fig. 19) when placed over the jar, which is as nearly full as possible, and the pressure being exerted, the middle part of the cover is slightly pressed lower than the level of the oil, forcing same to raise and expel nearly all the air which otherwise would have been imprisoned in the jar.

After the jar has been sealed it is processed; the expansion of the liquid would burst the jar should it not give enough. The glass jar is rigid and does not give; the cover from concave will be forced convex by the expansion and allowing the room it requires. (Fig. 21)

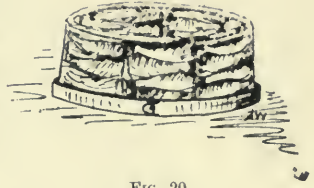


FIG. 20.

When cooling off the contraction will take place and the cover will resume its concave shape (Fig. 19.)

The reason of expelling the air by using a concave cover is not because the air would spoil the goods; I have explained before that the air cannot be the cause of fermentation; the object of expelling the air is to leave as little unoccupied space as possible inside the jar, which later will be placed cover down on the grocery counter or in the delicatessen store window. If it should show air or empty space, it would give a bad appearance and besides the less unoccupied space there is the less the contents of the jar will be disturbed in shipping, handling, etc. (Fig. (20.)

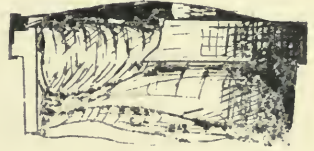


FIG. 21.

RIM OF THE JARS.

The cuts here annexed illustrate the usefulness of this peculiar shape of rim; it leaves no empty space where excess of oil could accumulate and turn rancid. (See fig. 21.) The cover, after removal of the ring when opening, remains as a perfect lid to the box. (Fig. 22



FIG. 22.

PROCESSING TINS AND JARS.

Tin cans or glass boxes are submitted to the same processing.

One-quarter boxes	1 hr. 30. min. in boiling water.
One-half boxes	2hrs. " " " " "

For larger boxes increase proportionally, do not cool off glass jars with water.

SEASONING OF THE OIL.

It is customary in Europe to add in each box of the superior grade the following spices:

Pepper	2
Cloves	1
A very small piece of thyme	
A very small piece of bay leaf.	

SARDINES WITH TOMATO SAUCE.

The sardines must be fried in oil; pack in tin or glass and cover with heavy tomato sauce instead of oil. This sauce is the same as described in the vegetable chapter "Tomato Sauce"; boil it, adding one ounce of butter per pound of sauce.

SALMON.

Salmon is packed in enormously large quantities and shipped all over the world, but, as a rule, its quality is poor, due to the lack of skill of the help employed. Take fresh killed salmon, cut in slices of the thickness of the cans or boxes and put in cold salt brine 24° Beaume and leave them for one hour. Shorten this time by half for small pieces.

Can in tins or glass jars, if any empty space fill with 3° Beaume salt brine, or, if preferred, plain water containing one ounce of alum to each three gallons of water, this to harden the flesh and prevent it from falling to pieces.

PROCESSING.

Process:

One-half pound,	1¾ hours
One pound,	4 "
Two pounds,	2½ "

Cool off the tins with cold water. For glass boxes, reduce the processing to seven minutes for the pound, of ten minutes for the two pound, but allow to cool off in the bath for fifteen minutes.

I would prefer the following process:

One-half pound,	45 min. at 222°
One pound,	1 hr. 15 min. at 222°
Two pounds,	2 hr. at 222°

SALMON IN GLASS BOXES.

Many cases of poisoning have been occasioned with carelessly packed salmon. The high grade should be put up in glass boxes, I refer the reader to the previous article "Sardines in Glass Boxes" which applies as well to this line.

SALMON IN OIL; PREPARATION, PROCESSING.

This is really the proper way to pack salmon, the great drawback is its price, which will always be much higher than plain salmon, owing to the labor it requires, and the cost of the oil.

Cut the salmon in slices, put in salt brine same as for plain packing, then dry them in a dryer same as used for sardines. When dry lay them flat, side by side on a wire tray, the bottom of which has been covered with white oiled paper. Lower the trays in hot oil in same apparatus as used for frying sardines; the oil must be hot but not enough to fry the fish; it must retain its shape and not turn dark, as this would make it unmarketable.

Allow the oil to drain same as for sardines, pack in tin or glass; cover with sweet oil, adding to each pound can

Bay leaf,	½
Clove,	1
Pepper,	3

Process tins or glass boxes as follows:

One-half pound,	1 hr. 40 min.
One pound,	2 hours
Two pounds,	2 hrs. 20 min.

Cool off the cans with cold water; allow the glass boxes to cool off fifteen minutes in the bath.

MACKERELS.

MACKERELS IN OIL.

Small mackerel, prepared same as the sardines, fried in oil, etc., are, in the opinion of many connoisseurs, superior to the real genuine sardines. Some manufacturers prefer frying in lard. Whether oil or lard is used, cook slowly, without actually boiling; the fish must remain soft, not be fried hard.

MACKEREL IN VINEGAR.

Large mackerel are put up in vinegar; on account of their thickness they must be slit on the back, with a knife, 1-2 inch deep from head to tail, make six oblique cuts on each side, one inch apart and 1-8 of an inch deep. Cut the head, trim wings and tail. Leave one hour in 18° Beaume cold salt brine, drain and dry. Fry two minutes in oil same as sardines, the oil must not be too hot.

Can in tins or jars, adding to each-

Two slices of lemon,
Two slices of onions,
One clove,
A small bunch of parsley.

Dip with half water and half vinegar.

If desired that the liquid should take into jelly, add to it before sealing a piece of softened isinglass. For high grade goods, dip with white wine instead of vinegar and water.

Process:

Pound,	16	minutes	in	boiling	water
Two pounds,	30	"	"	"	"
Three pounds,	45	"	"	"	"

HERRINGS.

HERRINGS IN OIL.

Small herrings in oil are prepared same as the sardines. They can also be prepared with tomato sauce.

HERRINGS IN VINEGAR.

Take regular size herrings, prepare them same as the mackerel, but without cutting on the back or stripping them on the sides with the knife, allow one and one half hour in the brine.

Spice and brine same as mackerel, adding a small piece of thyme in the can and a little Louisiana Paprica to the vinegar.

For high grade use white wine instead of vinegar and no water.

RUSSIAN HERRINGS.

Cut heads and pull out the inside, allow ninety minutes in 20 per cent brine, and dry by hanging the fishes tail up in the sun or in a hot and ventilated room for one hour. Fry in oil two minutes, the oil must not be too hot; in fact, the herring must be boiled, not fried, and is to remain white and bright. Drain and can in tins or jars: in each add

Two slices of lemon without zest,

Two slices onion,

A little piece of sage,

One half bay leaf,

A little paprica.

Dip warm with vinegar or white wine in which has been dissolved English mustard flour to taste.

Process:

One pound,	8 minutes in boiling water
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Two pounds,	12	"	"	"	"
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Three pounds,	20	"	"	"	"
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FRESH WATER FISHES.

All fresh water fishes can be canned; however, they are soft, and it is quite difficult to keep them whole. Carp, trout and pike are the best for canning, but they must be perfectly fresh. A fish that has been two days on ice will fall to pieces while processing.

They require tin cans of the length and as high as the approximate thickness of the fishes. There are two principal ways of preparing:

FISHES IN "COURT BOUILLON."

Cut the gills and remove with them the interior of the fish, lay twenty-five minutes in 22° Beaume cold salt brine.

Prepare the following bouillon:

Water,	2 gallons
Vinegar,	1 quart
Cloves,	10
Carrots, in slices,	6
Onions, in slices,	6
Cloves of garlic,	3
Pepper,	
Salt,	
A bunch of parsley	
A little thyme	

Boil slowly for one hour, replacing, at that time, with hot water, the amount lost by evaporation.

Keep on boiling and lay fish in for one minute, one fish after the other, then can, brine with the bouillon in which the fish has boiled, add to each can a small piece of isinglass, seal airtightly and process:

Pounds	1 hour at 216 deg. Fahrenheit
Two pounds	1 hour at 220 deg. Fahrenheit

Cool off with cold water.

FISHES IN "MATELOTE."

Prepare the bouillon, and cut the fishes in three or four equal pieces, boil them one minute and place in cans.

The bouillon is to be made as follows:

Melt twelve ounces butter and cook ten minutes on very slow fire with six carrots and six onions, both being sliced. They must cook, but not turn brown, then add 1 gallon red wine and one gallon of water, and other spices, as per "Court Bouillon" previously described.

After the pieces of fish have been boiled in this bouillon for the required time (one minute) keep on boiling the bouillon and thicken with browned flour. Pour hot over the fishes, seal and process same as "Court Bouillon" fishes.

In the cans, to decorate the fish, mushrooms, small pickled cucumbers and pitted olives may be added.

LOBSTER.

Canada actually supplies the whole world.

The packing of lobster requires more cleanliness and quick action than any other packing. There is but one way to prepare lobster.

Boil them alive in salt water (3 per cent.), cool promptly in cold salt water (6 per cent.), shell and can in tins or glass jars, cover with a little salt brine, which can be flavored by boiling one-half hour with pepper, bay leaves and cloves.

Process:

Tin cans or glass boxes, 2 hours in boiling water.

The phosphor of the lobster attacks and corrodes the cans, this is practically overcome by lining the cans with parchment paper. The coating of tin of the tinplate is very thin and uneven; the iron of the can is soon attacked. The iron is more easily attacked by the combined chemical action of the phosphor and the salt than the tin is; this is why after a few months the canned lobster takes the especial, often unpleasant, taste which cannot be otherwise described than "canned lobster taste." Everybody knows this taste, of which we cannot speak without an instinctive and peculiar contraction of the muscles of the face.

I am not a crank on glass and am sorry to say have no controlling interests in any glass house, but I consider it a crime to spoil good things, and it really hurts my feelings of "gourmet" when, peeping into a store, I see piles of what has been fine and delicate "lobster," but now "canned lobster." What a change!

At some period in old Rome without being a good "chef" no fat state office was obtainable. Brillat Savarin has in the old world rehabilitated the gourmet, has gained back for us the rank which we are entitled to in society. Well, in this new world if a census of the "gourmets" was taken, it would not only astound statisticians, but shake up the old routine of lobster packing.

"Gourmets" are found in all conditions of life, they are good talkers (they are more numerous in the political career than in any other), they are the most selfish human beings; flatter their palate and you will have returns. Keep on the flattery and they will stand by you.

Those who will eat "*canned lobster*" that taste lobster, after the first surprise is over, will have some more, and again as soon as possible.

"He who sinneth shall sin."

To make it short, there is no reason why the lobster should be packed in tin cans, the iron of which spoils it, when it can be put up in glass boxes that will keep and maintain it plain and real "*Lobster*."

In using the Phoenix device of air-tightly sealing, cover the glass box with the cap, and seal. Process same as tin cans, no bunching nor cooling off being required.

Some packers prefer boiling the lobster in fresh water and cool them in 18 per cent. salt brine (18 deg. Beaume cold). When packing in tins or jars hot dipping can be made with clear hot brine containing enough isinglass to make it in jelly when cooling off. It improves the appearance, especially when packed in glass.

SHRIMPS.

Boil hardly one minute in fresh water, drain, put in wooden buckets with a handful of salt, mix and shell them as soon as cold.

CANNING IN TINS.

Place them in a little muslin bag having exactly the shape of the cans used; when full close the bag and put in the can, which is itself lined with parchment paper. The bag before using should be wetted with 12 per cent. salt brine.

CANNING IN GLASS.

Put in the jars the shrimps, one next to the other, leaving as little empty space as possible, and seal airtightly. Or cover with 3 per cent. hot salt brine containing enough isinglass to make it take into jelly when cold.

PROCESSING—CANS OR GLASS JARS.

One-half pints	16 min. at 220 Fahrenheit
Pints	20 min. at 220 Fahrenheit

Or,

One-half pints	40 min. in boiling water
Pints	60 min. in boiling water

While hot, the shrimps are quite soft and should be handled very carefully, this applies as well to the taking out of the blanching water, to the shelling and to the handling of the cans and jars before they have thoroughly cooled off.

Shrimps' tails should remain whole and of soft pink color.

CRAWFISH.

WHOLE CRAWFISHES.

Prepare a bouillon same as the "Court Bouillon" described for the preparation of fresh water fishes, but much stronger in spices, especially pepper; it should be 1-2 white wine, 1-2 water, but without butter. Throw in the live crawfishes, of which the intestines have been extracted; for this take the crawfish in your hand and tear off the wing, which is in the middle of the tail; it will pull out at the same time a little black intestine, which is very bitter.

Boil one or two minutes, never more; put in cans or jars, dip with the strained "Court Bouillon" and process:

Cans or jars:

Pints	35 min. at 220 Fahrenheit
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Quarts	50 min. at 220 Fahrenheit
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Or, still better, on account of the soft nature of the flesh:

Pints	1 hour in plain boiling water
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Quarts	1 1-2 hours in plain boiling water
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Crawfishes should always be packed in glass jars.

CRAWFISH TAILS.

As the crawfishes are shelled before packing there is no need to extract the intestines. Throw them alive in bouillon same as described for "whole crawfish," boil two minutes. Shell and pack tightly in glass jars, cover hot with strained bouillon in which they have cooked, seal airtightly and process:

One-half pints	20 minutes in boiling water
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Pints	30 minutes in boiling water
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Allow to cool off for fifteen minutes before taking out of the processing bath.

Tin cans cannot be used for these goods.

OYSTERS.

Each packer has his own way of handling the oysters, as all is handling for these goods, and while packed in very small quantities in Europe, they are very popular in America.

Open the oysters; can in tins or jars, cover with the juice, which is previously strained, and seal airtightly.

Process:

One-half pints	35 minutes in boiling water
Pints	55 minutes in boiling water
Quarts	1 hr. 15 minutes in boiling water

This product is superior, but the process is slow.

OTHER METHOD.

Place the oysters in the truck of the dry steam kettle, steam just enough to force the shells open, the time required varying with the average size of the oysters.

Pack the oysters in cans or jars covering with the broth. Seal airtightly.

Process:

One-half pints	10 min. at 235 Fahrenheit
Pints	12 min. at 235 Fahrenheit
Quarts	15 min. at 235 Fahrenheit

The cans are *to be cooled off with cold water*; the glass jars must cool off slowly.

It is necessary that the oysters should be sound and fresh, and processed immediately after sealing.

PICKLED OYSTERS.

Steam fat oysters as if for canning, put in glass jars and cover immediately with hot, boiling, strained brine as follows:

Prepared vinegar	3 quarts
White wine	1 quart

Prepared vinegar is made in advance so as to lose no time when the oysters are in the jars.

Boil five minutes.

Vinegar	2 gallons
Mace	1-2 oz.
Nutmeg	1-8 oz.
Black pepper	1 oz.
Salt	2 oz.
Cinnamon	1-8 oz.
Cloves	1-2 oz.

Allow to macerate twenty-four hours, boil five minutes before adding the wine. Seal the jars airtightly. The most appropriate jar to our knowledge is the Phoenix glass cover jar. It has a glass cover which prevents the contact of the brine with the washer. The sealing machine closes 600 jars per hour; the sealed jars can then be processed same as usual.

MUSSELS.

Mussels are much finer for culinary purposes than oysters; time will come when the demand will be as large as for the oysters.

Steam same as oysters, but it requires shorter time, one minute being sufficient. Take out of the shells, pack in tins or jars, cover with broth and seal airtightly.

Process:

One-half pints	35 minutes
Pints	50 minutes
Quarts	1 hr. 10 minutes

Cool off the cans with cold water, allow the glass jars to cool off slowly.

In Europe, when canning, the white mussels are put in separate cans and are considered first choice, the yellow put up separately as second choice.

They can be processed at 235° same as the oysters, but they shrink more than when processed in plain boiling water.

Mussels must be fresh and processed as soon as sealed.

PICKLED MUSSELS.

Pickled mussels are prepared same as pickled oysters.

MILK.

Preserving milk has caused not only great deceptions, but also great financial losses to many enterprising preservers who had engaged in extensive canning or bottling without sufficient knowledge of the nature of the milk and the causes of its decomposition. In the milk sold by the retailers, we find most every variety of micro-organism represented, and the milk owing to its composition is such a good culture medium and so favorable to nearly all, that notwithstanding the fact that it can be sterilized in the laboratory, it is not practical and cannot be done at a business point of view.

COMPOSITION.

The milk is composed of water, fat, proteids, sugar and mineral matters.

The fat representing about 4 per cent., the proteids 4 per cent., the sugar 4 1-2 per cent. These three natures of products, as a whole, seem to realize all the desiderata of the best field for the development of the bacteria.

The milk secreted of the nursing mammals is nearly at blood temperature, this is to say the most appropriate temperature for the growth of the germs; it should, therefore, be cooled quickly by placing the cans in cold running water. As soon as cold it should be bottled, sealed and processed.

MILK AND BACTERIA.

The organisms attacking the milk are mostly brought in by the air, then, the less contact with air the better; for this reason only the bottling and sealing should be made in the shortest time possible after the milk has been cooled.

The fat to which the color of the milk is for the greatest part due is in globules which seem to be surrounded by a membrane, as they do not coalesce spontaneously; this fat is mostly composed of stearin and olein.

Centrifugal motion separates all the fat from the milk; should sterilized milk be beaten, the fat it contains would separate; for this reason an especial device for sealing the jars had to be constructed; the jar must be and remain absolutely full, so as, even should the jar itself be shaken, its contents will remain undisturbed.

The proteids are the casein, the albumen and a very small quantity of globulin. The two former are in a peculiar state, the casein is gelatinous and in solution, it is precipitated by acids. The lactic acid produced by the action of the *lacti acidi bacilli* causes this coagulation, in which case the globules of fat are enclosed in the casein.

The albumen contained in the milk is also of an especial form and is called lactalbumine; it is coagulated by heat.

The sugar of the milk is designated under the name of lactose and is able of alcoholic fermentation same as beet or fruit sugar. In some parts of Russia, alcoholic beverages are prepared by fermenting milk. However, it is not the great fungus that interferes with the preserving of the milk, as it is rather difficult to produce the required conditions to allow the *saccharomyces* to have a foothold before the butyric ferments start their work.

The *lacti acidi* bacteria and the *bacilli prodigiosi* are generally the first to attack the milk, decomposing the lactose into lactic acid, which causes the coagulation of the casein.

The bacteria grow best at a temperature of 85 deg. or about, this is the reason why the milk should be cooled off promptly and kept cold until processed, Their spores are hard to kill and some experts affirm that 250 deg. are not sufficient for their destruction, it is then essential that the milk should be bottled and sealed as promptly as possible as to shorten as much as possible the contact with air which brings in all the germs.

If a certain proportion of salt or sugar were added to the milk, we would not mind these spores, as the antiseptic qualities of these would prevent these dry form to sprout, but such is not the case, pure and natural milk must be bottled.

Both the *lacti acidi* and the *prodigiosi bacillus* are aerobic, but after they have sprouted and are adults they continue to grow, even in anaerobic state, for this reason the jar we will use will not only be airtight, but not contain a particle of air so as to prevent the germination of the dry forms should there be in the jar.

Great cleanliness must prevail as to avoid the introduction in the milk of putrid ferments such as the *bacillus butyricus*, *amyglobacter*, *cyanogenus*, etc., which being anaerobic, would develop in the jars still better than if air was enclosed, besides they are very resisting to the action of heat.

SPECIAL CONSTRUCTION OF THE JARS OR BOTTLES.

The jar constructed by the Phoenix Cap Company of New York fulfills theoretically all the requirements here above stated and its practicability seems to be guaranteed by its simplicity.

STERILIZING MILK.

The jar (Fig. 23) is filled with the cooled milk up to the very top, the cap is placed over and the sealing is done by a machine.



FIG. 23.

This cap is composed of a cover of pure tin having a hole in its center, this hole projecting on the exterior. When the jar is sealed by a vertical pressure of about 1,000 pounds on the superior flange of the metal ring, the rubber finds itself heavily compressed between four walls (Fig. 24), the setting of the lowest part of the metal ring over the neck of the jar causing it to remain compressed after the jar is released from the action of the machine.

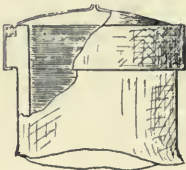


FIG. 24.

The jar would then be airtightly sealed if not for the projecting hole in its center. The bottle is placed in the processing retort with water reaching its neck and heated gradually until it reaches boiling, the water of the bath has expanded by heat and it now covers the jar.

The action inside the jar has been as follows:

The milk has been gradually heated and the air it contained in dissolution, not being soluble in hot milk, is set free, it accumulates on the top of the jar and by the expansion of the milk by the action of the heat this air, as well as the air we had enclosed in the jar, under the cap, is expelled. Should the liquid expand further, some of the milk will escape through the hole (Fig. 25). At this time the milk has nearly expanded as much as it ever will, by the means of pinchers the projecting hole of the pure malleable tin cover is sealed, this pinching sealing more airtightly than soldering would (Fig. 26).

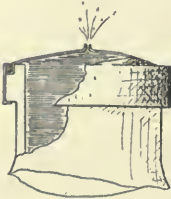


FIG. 25.

The cover of the processing kettle is then lowered bolted tight and the jars processed for hour at 245 deg. Fahrenheit.

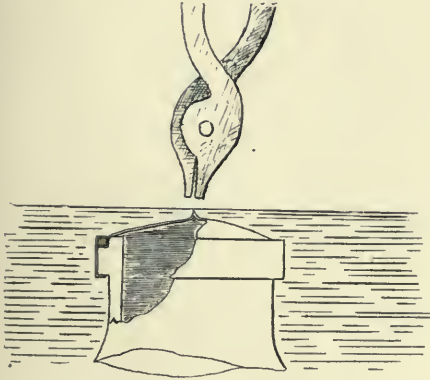


FIG. 26.

Let us follow the jar in the retort. Its contents will further, but little, expand, the malleable metal cover will give and allow for this increase of volume, the jar still appears, as per Fig. 26. During the processing there is no strain on the cap, the exterior pressure on the jar being in fact superior to the inside pressure. After the required length of time, lower slowly and progressively the pres-

sure, then shut off the steam altogether and open the cover. Fifteen minutes are required to progressively lower the temperature.

The milk, not having been actually boiled and no evaporation having taken the place, there is no or very little skim in the jar.



FIG. 27.

In cooling off, the milk will contract, its level will only be 1-4 or 1-3 of an inch lower than the top of the jar, the malleable cover from convex during the processing under the inside pressure will turn concave under the atmospheric pressure, and leave no vacuum, the jar may be shaken, its contents will remain undisturbed (Fig. 27).

PTOMAINES IN MILK.

If the milk is a good culture medium for the bacteria in general, it being an animal secretion causes it to be an especially good field for the pathogenic bacteria ((disease microbes), these by their action on animal and vegetable tissues produce alkaloids which are deadly poison to man and beast. Putrefactive ferments produce different results owing to the nature of the albuminoids of the product they attack. The various pathogenic bacteria are found in very large quantities in the stables

and the manure, therefore, all the efforts of the milk preserver will tend to quick work as to avoid exposure of the milk to contaminated air for more than the strictly required and unavoidable length of time.

Perfect cleanliness, quick cooling off and prompt processing are the guarantee of success.

Should any of these bacteria be enclosed in the jar, and this is often unavoidable, the use of the above described Phoenix device will tend to evacuate these and create a condition the most unfavorable possible to the germination of the spores the heat may not have destroyed.

The most common pathogenic organisms found in milk are the diphtheria, typhoid and the tetanus bacillus, while the anthrax, the coma or cholera, the scarlet fever and other pathogenic bacillus are not often found unless the organism of the animals secreting the milk are themselves attacked by any of these deadly diseases.

Let us examine the action of the processing in the described jars for the various and most common of these micro-organisms.

TYPHOID BACTERIA.

The typhoid bacillus develops best in an aerobic state, quick bottling will place the milk in an anaerobic condition, and should some spores sprout, experience proves that when the typhoid bacteria is in an anaerobic state it is much easier killed by heat than if it should be in an aerobic state, the conditions are then the most favorable for their destruction.

This bacteria can only develop in a slightly acid culture, therefore, it will not develop in the milk before lactic acid or butyric acid bacillus start their work; quick action will not allow these to act and make the milk acid.

The ptomaine produced by the typhoid bacteria is known as typhotoxin, it is an acid and not an alkaloid.

DIPHThERIA BACTERIA.

There are several varieties, but all having about the same characteristics, these bacillus grow best in an aerobic state, and what we said in reference to the typhoid bacillus will apply in this case.

The poison produced in an alkaloid very similar to strichnine and is neutralized by acids.

TETANUS BACILLUS.

These bacteria are in great numbers in the stables, they develop rapidly at blood temperature, milk being extremely favorable to their growth.

The tetanus bacillus are positively anaerobic, but under ordinary circumstances they grow slowly, as they only develop in the presence of lactic or butyric acid germs, and these by the great strength of their growth interfere at the end with large development of the tetanus. The construction of the jars described here before creating an anerobic state this bacillus would find the required condition for its growth which is averted by preserving the milk before the lactic or butyric acid producing bacillus have developed, under such conditions the tetanus have no chance to produce ptomaines.

Great care has also to be taken in milking as to avoid blood or puscells from the animal to be driven into the milk, these cells are often conveyors of pathogenic bacteria, especially of the tetanus.

The action of the tetanus bacteria is called lockjaw when it takes development into the human body.

CONTAMINATED MILK.

The milk of contaminated animals must not be used either for preserving or otherwise, and these animals should be killed and their body incinerated. If the milk of these animals is preserved, the bacteria having infested the milk at the time of its secretion, these have found their way into the globules of fat and particles of proteids with which they got intimately associated and are therefore much more difficult to destroy than if they had been deposited on the surface of the liquid by the air. In case of their presence in the animal, they have had, under blood heat, time to swell and are ready for action, if not already in action at the time of the milking. Bacteria deposited by the air being in their dry form require proper temperature to swell and sprout rapidly.

In the case of milk from contaminated animals, all the ptomaines formed before the processing will remain, and, in fact, be preserved with the milk; they are and remain poison whether preserved or not, and may cause death if absorbed.

CANNING OF MEATS.

BOILED BEEF.

Rub the pieces of meat with salt and sugar, 5 lbs. salt, 1 lb. sugar. Twelve hours later renew the rubbing, using each time about 5 lbs. of the mixture for each 100 lbs. of beef. Tie up with twine the pieces of meat and place them in the boiling kettle and cover them with the brine from the previous salting, and enough bouillon made by slow boiling for six hours of low grade meats and the bones. Maintain the temperature at 210 to 212 without actual boiling for 2 1-2 hours.

Cut the meat in pieces of proper size for the cans, fill with bouillon made by concentrating the bouillon of the cooking. A few calves feet should be added to help this bouillon taking into jelly. (Isinglass may also be added.) During the cooking great care should be taken to properly skim the foam.

Proper flavoring is obtained by boiling with the meat a bag containing for each 100 lbs. of meat

Bay Leaves	1-3 oz.
Pepper	1 oz.
Mace	1-4 oz.
Grated Nutmeg	1-8 oz.

Process:

1 lb. cans	1 hour 20 minutes at 235 deg.
2 lb. cans	2 hours at 235 deg.
3 lb. cans	2 hours 30 minutes at 235 deg.

Boiled beef is extensively put up for the supply of the European armies.

CORNERD BEEF CURING AND CANNING.

Rub the boned pieces of fresh meat with salting mixture prepared as follows:

Coarse salt	10 lbs.
Sugar	3 lbs.
Saltpetre	1-3 lb.

Place in barrels with a weight over to press, leaving ten days in a cool place, during which time, at intervals of two days the meat must be placed in another position, after which always replace weight; after this time take out the meat, wash it gently, clean the barrel and put in sufficient quantity of brine, made as follows:

Water	10 galls.
Salt	20 lbs.
Sugar	15 lbs.
Saltpeter	5 lbs.
Spices	

Boil slowly three-quarters of an hour, stirring until sugar and salt are entirely dissolved, then put in the barrel, straining through a sieve to separate the spices. These spices are for ten gallons of brine as follows:

Pepper	1 oz.
Coriander	1-2 oz.
Nutmeg	1-4 oz.
Cloves	1-2 oz.
Mace	1-2 oz.
Thyme	1-2 oz.
Sage	1-2 oz.
Bay Leaves	1-2 oz.

Place the beef in the brine when cold, and, from eight to twelve days later, according to the size of the pieces of meat, they will be sufficiently cured.

To cook the beef put it in a large kettle, enameled, if possible, cover with cold water, bring slowly to a boil and maintain a very slow boiling for one hour, cut in pieces of proper size for the cans, pack and cover with hot juice composed of

- 1-2 bouillon in which the beef has been boiled,
- 1-2 bouillon of calfs foot.

adding to it the juice produced by the first salting, the latter having been submitted to a short boiling and flavored with laurel, cloves and a little nutmeg. This juice will later take into jelly.

PROCESSING.

The packing is either made in tin cans or glass jars, sealed airtightly while still hot and processed immediately at 236 Fahrenheit.

One pound	1 hr. 10 min.
Two pound	1 hr. 40 min.
Three pound	2 hr. 10 min.

The processing is the same for either the cans or the glass jars, no punching or exhausting of air being required.

BEEF BRAISE.

Cut the beef in pieces of about two and one-quarter pounds each, rub with salt prepared as follows:

Salt	10 lbs.
Ground pepper	1 oz.

put in barrels without any brine and next morning rub them again, placing them back into the barrel. The next days they are sufficiently dry and cured.

Brown the pieces of beef on each side in a kettle on a lively fire, same as for preparing a roast. It must be done quickly as to brown the outer part leaving the inside rare. However, the meat must not be allowed to burn neither should the small quantity of melted grease in the kettle. As soon as it is well browned put in a kettle, covering with boiled beef bouillon, to which the juice produced by the salting has been added. There must be sufficient quantity of bouillon to totally cover the meat. Boil one hour very slowly so as not to break the pieces of meat. The kettle is also to contain a bag for each 5 lbs. meat: 2 garrots, 1 clove of garlic, pepper and spices. Should the pieces be very large, say five to six pounds, this time should be doubled.

Cut in pieces of proper size to fit the cans or jars, and fill these tightly; cover while still hot with very strong jelly made with part of the bouillon in which the beef has boiled and which has been slowly boiled for six hours with a few calves feet.

Seal airtightly and process:

One pound	1.10 hours at 235 deg.
Two pounds	1.50 hours at 235 deg.
Three pounds	2.20 hours at 235 deg.

The jelly should be strained through a muslin before used.

BEEF A LA MODE.

Beef a la mode is generally prepared by merely packing boiled beef used to prepare the bouillon and covered with a sauce made of bouillon, beef braise bouillon, roast beef gravy; it is made consistent with browned flour. The article being generally inferior in quality and of low price, there is little of real beef a la mode put up.

The beef a la mode is, in fact, nothing else but beef braise, but instead of covering with very strong jelly, cover with the bouillon in which it has been boiled, making it consistent by addition of browned flour.

The cans should contain a larger proportion of sauce than the braised beef; processing is also the same.

ENGLISH ROAST BEEF.

Proceed as for ordinary every day roast beef, but cook very rare, in other words, take off the fire when half cooked, cut in pieces to suit the cans or jars used, but in such a way that each can will hold rare and well done. Pack the well done on top, cover with very little gravy to fill up the empty spaces, but it should be well spiced.

Process:

One pound	1.35 at 235 deg.
Two pounds	2.10 at 235 deg.
Three pounds	2.30 at 235 deg.

There has been great discussion about "embalmed beef." We will dispense of giving the various formulas of the chemicals used; adding them to the meat is an unnecessary and unappreciated luxury.

STEAKS.

Prepare same as braised beef; rub the pieces with melted grease, then cook rare in the frying kettle, same as if or immediate use. Cut in pieces, can, cover with the juice or gravy of the cooking. Seal and process.

One pound cans	1 hr. 20 min. at 235 deg.
Two pound cans	2 hr 10 min.at 235 deg.

BEEF TONGUES.

Lay on the botom of the wooden or stone tank 1-2 inch of salt mixture, lay the tongues on it, pressed one against the other, cover with a layer of salt mixture, another row of tongues, and so forth. Keep the whole pressed down by a plank of wood of proper width, on which place a stone or weight of about 30 pounds, and turn over every day. Four days later the tongues are salted enough, take them out and hang them to dry.

The salting mixture should be composed as follows:

Salt	50 lbs.
Sugar	10 lbs.
Saltpetre	5 lbs.

When ready for canning wash the tongues and let them soak a few hours in cold water; remove their skin and cook them 1 1-2 hours in water containing a bag holding for, say, 100 quarts of water 1-2 pound of mixed spices.

These spices should be prepared as follows:

Cloves	1 1-2 lbs.
Coriander	1 1-2 lbs.
Nutmeg	3-4 lb.
Mace	1 lb.
Bay leaves	2 lbs.
Sage	2 lbs.
Marjoram	2 lbs.
Thyme	1 1-4 lbs.
Juniper	1 1-2 lbs.
Caraway	1 lb.

CANNING IN TIN OR GLASS BOXES.

After proper cooking, lay the tongues rolled up in tin or glass boxes of proper size, placing on top of each a round piece of wood. to keep them pressed down until cooled off.

Process as follows, tin or glass:

Large tongues	3 hr. 15 min. at 235 deg.
Medium	2 hr. at 235 deg.
Small tongues	1 hr. 15 min. at 235 deg.

SMOKED TONGUES.

Smoked tongues are often canned; they should be prepared in the same manner as explained here above, but, after the 60 hours salting, they should be allowed to remain four days in the smoking-room. When canning, soak for 24 hours in water, then boil and can as ordinary tongues.

HONEYCOMB TRIPE, "A LA MODE DE CAEN."

The tripes are delivered to the manufacturer ready to be cooked; they should be perfectly white and clean.

[The old process is to place the tripes, the feet and all the necessary aromates, in large earthenware receptacles, place a cast iron disk to keep the tripes in the liquid and cover the whole with sheets of paper pasted with starch paste to the side of the turine and forming a tight closure to the receptacle. The paper is then greased with a brush and melted fat.

The earthenware receptacles are placed in a baker's oven and baked for 8 to 10 hours over night, and then the tripes, with their juice, are canned.

In the modern factories large flat bottom kettles are used; they have a double bottom for steam heat and are made of either cast or sheet iron enameled on the inside. A heavy cast iron cover takes the place of the paper cover.

The "Tripes a la mode de Caen" are prepared as follows:

Clean in running water the tripes of fresh killed ox, then wash and scrape them in lukewarm water, and when perfectly clean allow to remain until night in cold, clear running water. The four feet should also be scalded, scraped and cleaned. Cut the tripes in pieces about 4 x 4 and place them in the kettle, being careful to have one of the feet on the bottom, two in the middle and the other on top; each foot must be cut in two lengthwise. Salt proportionally of 3 pounds of salt to 100 pounds tripe. Flavor with a bunch of parsley well tied up, 2 pounds onions cut in halves and 1 1-2 pounds sliced carrots. The spices: pepper, thyme, laurel and cloves, must be enclosed in a fine muslin bag.

Do not use any grease but 1 1-2 pounds of fine fresh butter; add 1 pint of water, place on the tripes a cast iron or sheet iron disk of a little less than the diameter of the kettle, close with the

cover of the kettle and turn the steam on and maintain a very slow boiling for 8 hours. (See steam iron kettle, fig. 16.)

Can in tins or glass jars while hot, and, not putting any carrots or onions in the cans, divide the sauce equally among the cans; the sauce must be constantly stirred while filling the cans in order to well distribute the fat that floats on top of the same.

Each can is also to contain a small piece of the meat of the feet.

Process :

One pound cans	1 1-2 hours at 235 deg.
Two pound cans	2 hours at 235 deg.
Three pound cans	2 1-4 hours at 235 deg.

The labels should bear instruction to the consumer: to heat in boiling the can, pour the contents in a hot dish, and eat on hot plates.

ROAST VEAL.

Leave the pieces whole, placing them on roasting pans which have previously been greased, and pour a little water to cover the bottom of the pan; the oven must be hot; place the pans in it, allowing the meat to take color; once in a while with a large spoon take the juice and pour it over the pieces of meat; in 50 minutes the largest pieces will be cooked enough; cut in pieces of proper size to fill the cans and cover with jelly made by boiling the bones and two veal's feet, and to which has been added the gravy of the roasting. Be sure the jelly is properly salted and of clear color, if not, it should be filtered hot through a flannel filter, same as used for clarifying sugar syrup.

Process :

One pound cans	1 hr. 10 min. at 235 deg.
Two pound cans	1 hr. 50 min. at 235 deg.

Always place a few carrots and one onion in each roasting pan. The roasting can be made in a steam kettle.

VEAL CUTLETS.

Cut the bone short as it would be in the way for canning; roast the cutlets in a frying pan, which must contain very little grease, 2 or 3 spoonfuls only, and be hot. Cook both sides; the

cutlets must take nice roast color, but do not actually cook the meat. Can in tins or glass dishes, cover with strong, hot jelly, seal airtightly, and process:

One-quarter pound 2 hr. 10 min. at 235 deg.

One pound 1 hr. 20 min. at 235 deg.

Two pounds 1 hr. at 235 deg.

If tin cans are used they should be flat in shape.

ROAST PORK.

Place the fresh ham on roasting pans which have previously been greased with lard and operate same as has been described for roast veal. The same processing should also be given.

Instead of carrots place one or two small turnips in each frying pan.

Pork shoulders instead of ham also give a fine roast, they should be rolled up the shape of the cans before roasting. A little flavoring by spices, same as given for "beef tongues," will be of advantage.

A little vinegar can be added to the jelly used for filling the cans.

PORK CHOPS.

Prepare same as veal cutlets, but flavoring more by using instead of pepper a mixture of spices, described under the title: "especial spices for meats."

SAUSAGES—LORRAINE SAUSAGES

In the genuine only pork meat is used; in the domestic 2-3 pork, 1-3 beef.

Hash together:

Meat	100 lbs.
Fat Bacon	25 lbs.
Saltpetre	2 ozs.
Crystallized sugar	2 ozs.
Salt	3 lbs.
Especial spices for meats	2 ozs.

After the meat is hashed add 4 ozs. whole black pepper and

mix well; allow the sausages to dry for 2 or 3 days in an aerated room and smoke them for a few hours only, they must be very lightly smoked.

When canning soak them first in cold water for one hour, then heat slowly so as to swell them progressively, leave 1-2 hour in the slow boiling water and can standing up in cans of proper height. Cover with melted lard for European market; meat jelly for American trade. Seal and process:

Two pound cans 1 hr. 30 min. at 228 deg.

Three pound cans 1 hr. 45 min. at 228 deg.

Do not process at higher temperature, as it would melt the fat of the sausages too much.

SALAMI.

There is no standard quality, the highest grade is made of pure pork, the cheapest (in Europe) is made of horse flesh, and in this case the proportion of pepper and saltpetre is increased 33 per cent.

A good receipt is the following—chop fine:

Fresh pork meat 75 lbs.

Beef 25 lbs.

Then crush in a mortar, adding:

Salt 3 1-4 lbs.

Saltpetre 2 1-2 ozs.

Especial meat spices 2 ozs.

Pepper (whole) 12 ozs.

Strong California white wine 1-2 gal.

Store in the ice box for two days, then add:

Wine 1 qt.

Crushed garlic 1-4 lb.

Salted bacon, 12 lbs., cut in cubes 1-2 x 1-2 in.

Hang the sausages to dry in well aerated place for 6 to 8 weeks.

“LYON” SAUSAGE.

Many different grades and qualities are on the market, the genuine being prepared as follows:

Macerate one day 100 pounds of pork flesh with

Salt	4 lbs.
Sugar	1-4 lb.
Pepper	1 oz.

Then chop and crush, adding 1 1-2 ozs. garlic and 14 lbs. of fresh salted fat bacon cut in cubes 1-2 x 1-2 in., whole pepper 2 ozs.

These sausages require three months to be properly dried. Those made with beef flesh are sufficiently dried in 6 to 8 weeks. They are prepared as follows:

Chop and crush, then add fat salted bacon cut in cubes 13 lbs.

Ground pepper	1-3 lbs.
Sugar	10 oz.
Saltpetre	1 1-4 oz.
Salt	3 lbs.
Cloves	1-4 oz.

When thoroughly crushed and mixed add 5 oz. whole pepper.

ESPECIAL SPICES FOR MEATS.

Dry the spices in a temperate oven, then grind them as fine as possible, and keep in tightly closed boxes or glass jars.

White pepper	2 1-2 lbs.
Dried red pepper	12 oz.
Cayenne pepper	1-3 oz.
Dried yellow peppers	3 oz.
Hungarian paprika	4 oz.
Nutmeg	3 oz.
Mace	4 oz.
Bay leaves	4 oz.
Cinnamon	3 oz.
Cloves	3 oz.
Coriander	2 oz.
Basil (basilic)	1 oz.
East Indian Curry	2 oz.
Savory	2 oz.
Marjoram	1 1-2 oz.
Sage	1 oz.
Rosemary	1 oz.

This mixture is one of the most perfect and is used by manufacturers of "Pates de foies gras" (goose liver pates) in the East of France. It answers all the requirements for all meats in general from beef to fowl and game.

PREPARED SALT.

The best packers in Europe sell in sealed packages (glass) prepared salt containing exactly the proportion of pepper and spices required for every day's use in the family. It is prepared by mixing thoroughly 5 lbs. fine salt, 4 oz. of above described spices. This mixture is also the most convenient for the packer and allows to flavor properly by merely putting in the goods the required quantity of salt.

SLICED MEATS IN GLASS JARS.

Sliced bacon, ham and dried beef are extensively put up in various kinds of glass receptacles. We will only describe the Phœnix jar, which we consider fulfills all the requirements for this line of goods and besides its own merits, possesses all those offered by the other packages actually in use.

There are two essential points for the closure:

First. It must allow the exhaustion of the air.

Second. It must retain the vacuum created.

It must allow, the exhaustion of the air because the meats that are placed in the jar contain enough salt and saltpetre to insure their keeping by the natural antiseptic strength of these two named products.

If air was inclosed in the jar, this imprisoned air would spoil; it would actually rot and cause the meat to mold and decay.

It must retain the vacuum, because, should it allow air to get into the jar again, this air would with itself bring ferments into the jar. The air enclosed in the jar would, same as in previous case, decompose and rot and cause the spoiling of the meat.

The jar has a peculiar finish of the neck (fig. 28) and the closing device is composed of a rubber ring and a metal cap, the latter decomposing itself in two, the cover and the band (fig. 30).

The cover is encased into the ring forming a solid whole (fig. 29.)

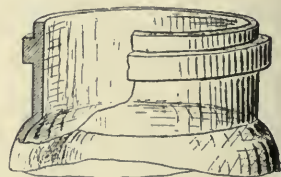


FIG. 28.

In order to operate the closure, place the filled jars on trays of one or two dozen, place one rubber ring on each jar and then



FIG. 29.



FIG. 30.

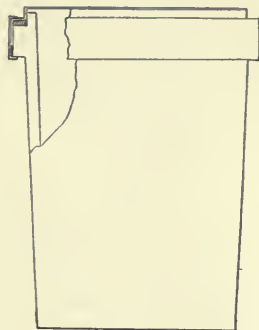


FIG. 32

the caps (cover with its metal band around), then place a cover on the tray, this cover having flat steel springs, exercising a gentle pressure on the cover of each jar (fig. 31).

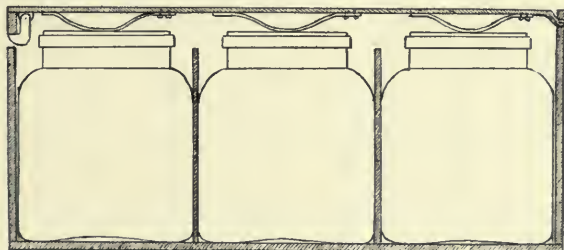


FIG. 31.

Place the trays in the vacuum tank or closet, put the pumps in motion and when the required vacuum is attained, open the valves and allow the air into the retort or closet. The atmospheric pressure, guided by the spring of the cover and acting on the covers of the jars will cause the caps to adhere firmly on the jars and actually make an airtight closure.

The jars are then submitted to the action of the Phoenix capping machine.

The rubber ring is already compressed by the atmospheric pressure on the cover, the machine will add to this, 600 pounds pressure, and while this pressure is applied, the setting rollers of the machine will turn over the rim of the jar the lowest part of the band of the cap. The rubber ring is enclosed between the cov-

er on two sides and the glass on the two others; it is maintained under the high pressure under which the sealing was made and it will remain so until the consumer releases it by removing the ring of the cap. (fig. 32).

The rubber ring may expand, may shrink, may turn hard; it is maintained under the pressure, set, the vacuum will always hold and the goods are safe.

PORK TONGUES.

Rub the tongues with salt prepared same as used for beef tongues and lay the tongues side by side in a vat and keep them under pressure by the means of boards of wood and a stone. Every two days turn them over adding a small quantity of the same prepared salt and in about twelve days the tongues are salted enough. After being washed and cooked same as beef tongues they are ready to be packed in tins or glass jars of proper size.

Process 1 lb. cans or jars 1 hr. 20 min. at 235 deg.

Process 2 lb. cans or jars 2 hrs. 10 min. at 235 deg.

ROAST MUTTON.

Remove all the skins and bones of the legs, breast and shoulders. The breast should be rolled up and tied with twine. Make a strong bouillon with the bones, skins, the neck and other unemployed parts of the mutton, this bouillon added to the gravy produced by the roasting will be used to fill the cans after a piece of roast has been placed in each.

Roast the mutton slowly so as to cook the inside, that must not remain rare. The roasting can either be made in an oven in roasting pans or in kettles on direct fire, flavor the meat by salting it with prepared salt (see index—"Prepared Salt") and adding a few cloves of garlic to the bones when preparing the bouillon. This bouillon must be very strong, which is easily obtainable, as in fact very little of it being required, the cans being nearly full of meat.

Process:

1 lb.	1 hr. 40 min.	at 235°
2 lbs.	2 hr.	"
3 lbs.	2 hr. 20 min.	"

MUTTON TONGUES.

Rub the tongues with a mixture of salt, sugar and saltpetre same as beef tongues and lay them side by side in a vat with a weight to keep them pressed. Every two days turn them over, with an occasional addition of the salt mixture. After ten days remove them to another vat and cover with brine:

Water	25 gallons.
Salt	90 lbs.
Saltpetre	9 "
Sugar	20 "

Put on fire and keep boiling with a muslin bag containing:

Juniper Berries	1 oz.
Mace	1 "
Coriander	1 "
Bay leaves	1 "
Sage	1-2 "
Thyme	1-2 "
Cloves	1 "

1-2 grated nutmeg.

When cold pour over the tongues. Two weeks later the tongues are cured. Hang them to dry. When ready to pack soak them a day in cold water. Cook and can same as beef tongues and process same as pork tongues.

IRISH STEW.

Irish stew is prepared in the regular way, this is to say, cut the meat in pieces and boil in a kettle with just enough water to cover the meat. Add the usual flavoring, a bunch of parsley, sliced onions and enough prepared salt to make it palatable. Boil quarter of an hour during which nearly half of the water must have evaporated. Can the meat, covering with the bouillon. Seal airtightly and process:

1 lb. cans	1 hr. 20 min.	at 238°
2 lb. cans	2 hrs.	at 238°
3 lb. cans	2 hrs. 15 min.	at 240°

FRENCH STEW.

Take shoulders of mutton only, cut in pieces same as for

Irish Stew and let them take color in a kettle containing a little grease (melted beef, veal or pork fat). The fire must be lively and the grease hot when the meat is placed in. In fifteen minutes the meat must be fairly roasted. Can the meat and cover with sauce prepared as follows: Add to the kettle in which the grease has remained 10 oz. of flour for each pound of grease, or about—leave on the fire, stirring with a wooden spatula, until the sauce is fairly brown, then add bouillon so as to obtain enough sauce for all the cans. Add to it one small size boiled onion and two boiled turnips, both crushed as fine as you possibly can, salt to taste with “prepared salt” that will in the same time give proper flavoring. Boil the same for ten minutes, then fill the cans with it.

Process:

- 1 lb. 1 hr. 25 min. at 236°
- 2 lb. 2 hrs. at 236°
- 3 lb. 2 hrs. 15 min. at 240°

MEAT JELLY.

Meat jelly is used in many instances in meat packing, but generally to fill the cans or jars containing tongues, pork, roasted fowl, etc., its preparation is simple, but great care should be given not only to make it, but to clarify it. A good deal depends on its appearance, it must be clear and bright.

Boil slowly for 8 to 10 hours beef and veal houghs, bones, gelatinous parts of pork, sward, heads, etc., with a little more water than actually required to cover them, adding enough of “prepared salt” to give it good taste and a bunch of onions, carrots, parsley and celery. The jelly must have good taste, but not be highly flavored.

After 8 hours’ boiling drain the jelly, pass through a hair sieve and put it in another kettle. Bring to a slow boiling and remove all the fat and foam that rises to the surface. Then clarify.

CLARIFICATION OF MEAT JELLIES WITH BLOOD.

This process is most reliable and can not fail to give the brightest jelly. Add to the jelly a little of cream of tartar to

make it slightly acid, or a cristal of tartaric acid. Stop boiling and stir the mass of liquid while you pour in 6 oz. of mutton blood. Keep on stirring the whole, turn on the steam and allow to boil for 2 or 3 minutes, no more. Pour the hot jelly through a wet flannel and it will be perfectly bright.

CLARIFICATION OF MEAT JELLY WITH EGGS.

Remove all the fat and foam, then add a little vinegar to the jelly to make it slightly acid. Take the white of 3 eggs as many times as you have quarts of jelly (10 quarts equals 30 eggs), add to them 1 oz. of water per egg and beat them thoroughly and pour the whole in the jelly, stir gently and turn the steam on. As soon as it starts boiling shut off the steam and pass the hot jelly through a wet fabric or flannel. It will be clear.

JELLY WITH ISINGLASS.

This method of clarification is also employed to clarify the jelly made by dissolving on fire isinglass which has previously soaked one day in water. Add salt and mixed "meat spices" to taste and flavor with port or sherry wine. Steam jacket kettles should be used, or if on direct fire use a bain-marie.

GAME.

VENISON STEAK.

Take off all the bones and nerves, throw them in a kettle containing a little grease on a lively fire, after 10 minutes they are well colored, add a few quarts of bouillon and boil slowly 3 hours. This you will use to fill the tins after the meat has been canned. While the bones are being boiled roast your venison in a hot oven or in a kettle on lively fire. The kettle is to contain a little lard and it must be very hot when the meat is placed in.

Cut the venison in steaks of proper size for the cans, cover with the bone bouillon to which the gravy of the roasting is to be added. Flavor with "prepared salt."

HARE STEW, FRENCH STYLE.

Hare stew is extensively canned in the East of France and the West of Germany under the respective denominations of "Civet de Lievre" and "Hasenpfeffer." Remove the skin first, then the intestines and cut the hare in pieces. Sawing where there is possibility, making for the whole a total of about 20 pieces exclusive of the head which is to be cut lengthwise in two parts. The head will be stewed as well as the other part but is not to be canned.

Save all the blood you possibly can and place the chopped parts in enameled or earthen ware vats or terrines in order to retain the blood that will run from the fresh cut pieces (the liver must be kept separate).

The average number of hares that can be cooked in a kettle at each batch is 8 to 10—we will therefore describe the preparation of a batch of 10.

Melt in a kettle 2 1-2 lbs. of butter and smoked bacon, cut in small cubes, then add to it 3 1-2 lbs. flour, stir gently until the flour has turned perfectly brown. Very carefully put in the pieces of hare, stir gently with wooden spatula and pour in enough red wine to cover the meat (about 15 quarts), 12 medium size onions, 6 chopped and crushed cloves of garlic, salt and enough "mixed spices" (see "especial spices for meats")—it must be well spiced.

Boil 20 to 25 minutes, do not crush the meat. With the skimmer pick the pieces of meat, placing them in an earthenware turine and fill the tins.

To the sauce remaining in the kettle add the blood, it must be done as follows: Crush fine the liver (the gall being carefully removed), mix with the hares blood, 3 pints of fresh pork blood and one pint of wine. Stir, adding slowly 2 quarts of the hot sauce from kettle, then pour the whole into the kettle. Boil 5 minutes, during which dissolve 1-4 lb. of flour in one pint of sauce, pour in the kettle, and stirring continually, boil very slowly for 2 or 3 minutes until the sauce has thickened properly.

Fill the cans with sauce, seal air tightly and process.

1 lb. cans 1 hr. 25 min. at 222°

2 lb. cans 1 hr. 50 min. at 222°

3 lb. cans 2 hrs. 10 min. at 222°

The heads must not be put in the cans, while the onions can if they have first been slightly browned in butter before being

added to the stew. The heart must be cut in two as it is hard to cook.

HARE STEW—ENGLISH STYLE.

The product obtained by the English process is far from being as rich as the French preparation. Operate as follows:

Cut in pieces same as previously explained, remove the liver, the heart and the head, which will not be used.

FOR EIGHT HARES.

Place the pieces in the kettle and pour over enough melted meat jelly to cover. Add:

Medium sized onions, chopped	10 pieces
Garlic, crushed	10 cloves
Powdered Curry	6 ozs.
Salt	To taste
Mixed spices	To taste

For mixed spices see index ("Especial Spices for Meats").

Boil fifteen minutes, then thicken by addition of 4 ozs. of flour dissolved in 1-2 pint of the stew and added to the whole while you stop boiling.

Process:

1 lb. cans	1 hr. 35 min.	at 222°
2 lb. cans	2 hrs.	at 222°
3 lb. cans	2 hrs. 20 min.	at 222°

RABBIT STEW.

For rabbit stew operate same as described for hare stew, French style, but instead of adding wine to the rabbit after it has been for two minutes in the grease and fat add 1-2 white wine, 1-2 meat bouillon, and instead of adding browned flour to give consistency to the sauce, add plain flour diluted in a pint of the sauce, then add to the whole. Can same as hare stew and process same length of time. The head, heart and liver are not used. The stew can be prepared with wild or domestic rabbits.

WHOLE ROAST CHICKEN.

Take young chickens, dress them, and roast either in the kettle or in a hot oven. In fifteen minutes they must have taken a good color; place hot in the cans, fill up to 1-3 of the can, with the gravy and a little melted butter. Add salt and "mixed spices." (See Especial Mixed Spices.)

Process:

Whole chickens	1 hr. 30 min. at 222°
1-2 chicken (split lengthwise)	1 hr. 10 min. at 222°
1-4 chicken (leg or wing)	55 min. at 222°

CHICKEN IN JELLY.

Dress the chickens and boil them until one-half cooked in enough meat jelly to cover them, adding one quart of white wine and one calf's foot for each two chickens. Flavor with salt and "mixed spices." When the chickens are one-half cooked remove them from the kettle and put whole in oval cans of proper size. During this time the jelly must have been clarified, (See "Clarification of Meat Jelly") pour it hot in the cans, enough to cover the chickens. Seal and process:

If desired, to pack 1-2 and 1-4 chickens, they must be cut before cooking.

Process:

Whole chickens	1 hr. 15 min. at 222°
1-2 chicken	55 min. at 222°
1-4 chicken	45 min. at 222°

The jelly must be bright and clear; the canning can be made in tins or glass boxes with the Phoenix caps.

CHICKENS IN ALL FANCY STYLES.

Chicken Madeira sauce, chicken sauce piquante, etc., can all be easily prepared. Dress and cut the chickens same as for an ordinary stew, roast in a frying pan containing 1-4 inch of 1-2 lard, 1-2 butter. Do not actually roast, but leave long enough to give color to the meat. Can and cover with sauce. Seal and process:

1 lb. cans	1 hr. at 222°
2 lb. cans	1 hr. 10 min. at 222°
3 lb. cans	1 hr. 20 min. at 222°

Under the heading of "Sauces" is given all the varieties of sauces that can be used.

DUCK.

There is not enough meat in the duck to warrant its canning whole; roasted or otherwise, it is always cut in pieces.

Dress the duck and roast it same as a chicken. When half cooked, but well browned, let it cool off; cut in pieces and can; cover with sauce of the variety you have selected from the chapter "sauces." Seal and process:

1 lb.	1 hr. 15 min. at 222°
2 lbs.	1 hr. 40 min. at 222°
3 lbs.	2 hrs. at 222°

Vegetables may be added to the cans such as peas, small turnips, etc. In this case add a little melted smoked bacon, in which one or two onions have been fried. The vegetables must be blanched before canning. Canned vegetables can be used for the purpose. Flavor with "prepared salt." (See Index.)

GOOSE IN JELLY.

Dress the goose and cut in four parts; place them in a kettle, covering with melted meat jelly, to which add one calf's foot for each goose. Add a few carrots, onions, a little parsley, "especial mixed spices." Boil slowly.

When half cooked take the pieces of goose out; can in oval tins or glass jars of proper size, cover with the jelly, that must first be clarified. (See Clarification of Meat Jelly.) Seal air-tightly and process:

Can of 1 quarter goose	1 hr. 15 m. at 222°
Can of 2 quarters of goose	1 hr. 30 m. at 222°
Can of 3 quarters of goose	1 hr. 40 m. at 222°
Can of 4 quarters of goose	1 hr. 50 m. at 222°

ROAST GOOSE.

Roast goose is prepared same as the roast chicken, but process ten minutes longer. Geese, same as ducks, can be prepared with all kinds of sauces; can also be put up with vegetables or sauerkraut. In the latter case the sauerkraut must be ready cooked when added to the cans.

ROAST TURKEY

Dress the turkeys and roast them either in the steam kettle or the baking oven. This must be done quickly, and as soon as it has taken a good roast color remove from the kettle and cut in pieces of proper size for the cans; prepare a good gravy with an old turkey cut in pieces; these well roasted, add enough meat jelly and boil 1-2 hour. The cans must only be 1-3 full of gravy. Seal and process:

1 lb. cans	1 hr. 20 min. at 222°
2 lb. cans	1 hr. 45 min. at 222°
3 lb. cans	2 hrs. at 222°

STEWED TURKEY

Cut the turkey in pieces, the legs being put separately. Boil in a kettle enough water to fully cover all the pieces, add salt, "special meat spices," a few carrots, onions and a little parsley. First put in the legs, and after 15 minutes' boiling add all the other pieces. When 3-4 cooked, can the turkey, strain the juice and thicken it with flour in the proportion of 1 oz. of flour and 1 oz. of butter for each pint of bouillon. Fill the cans and process same as the roast turkey.

The boiled turkey can be covered in the can with all the various kinds of sauces, described under the title "Sauces." A few canned or blanched fresh mushrooms, added in each can, will add flavor and improve the appearance.

ROAST PHEASANTS

Roast the pheasants until 1-3 cooked only. However, they must have taken a good roast color. Can immediately, adding to each can its part of gravy, 3 ozs. fresh melted butter and enough "mixed spices" to flavor.

Seal and process:

Large size	2 hr. 15 min. at 222°
Medium size	1 hr. 55 min. at 222°
Small size	1 hr. 45 min. at 222°

The cans must not be too large, and the oval shape is preferred.

PHEASANTS WITH SAUCE

Pheasants, same as all other fowl, can be prepared with Perigueux, Madeira sauce and others. For this cut the bird in pieces and roll each piece in flour; roast them quickly in a frying pan on lively fire, just enough to give them good color. Can, covering with the sauce you have selected, to which the gravy has been added. (See "Sauces.")

Process:

1 lb. cans	1 hr. 40 min. at 222°
2 lb. cans	2 hr. at 222°
3 lb. cans	2 hr. 20 min. at 222°

GROUSE AND WOODCOCK

Grouse and woodcocks are prepared in the same way and styles as pheasants. Same processing.

ROAST QUAILS

Cut the head and wings as customary for this bird, roll around it a slice of fresh bacon (not smoked), which you fasten with strings, and roast the quails for 5 to 8 minutes, according to size, until they have taken good color. You can roast in a kettle or an oven. Can, adding the gravy and a little melted fresh butter. Flavor with "mixed spices."

Process:

3 quail cans	50 min. at 222°
4 quail cans	1 hr. at 222°
6 quail cans	1 hr. 10 min. at 222°
8 quail cans	1 hr. 20 min. at 222°

Quails are also canned with vegetables, these are added to the cans; peas are the most popular. Canned vegetables can be used. Processing remains the same.

ROAST PARTRIDGES

Dress the partridges, cover them with slices of fresh bacon (not smoked or salted), tying the whole with strings. Flavor with "mixed spices" and roast in an oven or in the kettle until it has taken good color, 15 minutes being plenty for this.

Can in individual tins (one bird per can), placing a piece of bacon on the bottom and one on top. Add the gravy and 2 ozs. of melted fresh butter.

Process: 1 hr. 15 min. at 222°.

Partridges cut in pieces can be prepared same as pheasants and canned with various kinds of sauces. (See "Pheasants with Sauce.")

SQUABS

Roast squabs are prepared the same as roasted partridges, or with various kinds of sauces same as pheasants, or with vegetables same as quails. Squabs are always roasted having a coating of sliced fresh bacon tied with strings. When put up with sauce the squabs are left whole, roasted first, then the sauce or vegetables are added.

SAUCES

The sauces can be divided in two sections, the brown and the white sauces, each class being made of one especial stock to which different flavorings are given in order to prepare the sauces of various determinations.

STOCK BROWN SAUCE

The stock brown sauce is the mother of all brown sauces. It can be prepared in large quantities and the next day divided into parts for the various brown sauces required for the day's pack, it being Madeira, Perigueux, turtle, pepper sauce or others. Prepare as follows:

For the "brown sauce," also called "sauce liee" and "Spanish sauce," first make the "brown stock" by melting on slow fire 4 lbs. of flour in 5 lbs. of butter, turn slowly with a wooden spoon and keep heating slowly, always stirring until it has taken a good brown color. It requires about half an hour. Add slowly 6 quarts of meat bouillon, and when thoroughly mixed add 30 quarts more. Boil very slowly for 30 minutes, skimming once in a while and the sauce is ready. It can be used to cover roasted or boiled meats. The brown stock (previous to the addition of the bouillon) is same as used for all other sauces.

SAUCE MADERE

For 35 quarts of sauce take 30 quarts of bouillon, made by boiling 5 hours in water 20 lbs. of beef and 20 lbs. of veal without fat and which have first been roasted for a few minutes in a frying pan with a little butter. To these 30 quarts add 3 quarts Madeira wine, 2 ozs. sugar and the juice of 5 lemons. Mix with "brown stock" in same quantity and in same manner as described for "brown sauce."

SAUCE GODARD

Is prepared same as "Sauce Madeira," but adding 4 lbs. of roasted sweetbreads finely chopped, a few sliced truffles or truffle peelings, 3 cans of mushrooms sliced and a touch of Cayenne pepper.

GAME SAUCE

For venison, boar and other game fry in butter equal quantity of carrots and onions, both being sliced, and 1-2 the quantity of mixed turnips and parsnips. Then transfer to a kettle, cover with red wine, add salt to taste, spice strongly with "mixed

spices," add a bunch of parsley and boil very slowly 25 minutes or about. Strain through a flannel and proceed same as for the "brown sauce," but replacing the meat bouillon by the same quantity of the above preparation.

PEPPER SAUCE

The pepper sauce, also called "sauce poivrade," is used for all kinds of game. It is prepared same as the game sauce, but increasing the quantity of onions and suppressing the turnips and parsnips. Use white wine instead of red and a glass full of vinegar to each 5 quarts of sauce. It should also be richer in spices. (See "Mixed Spices.")

SAUCE PERIGUEUX

The "Sauce Perigueux" is prepared same as "Sauce Madere," but needs the addition of gravy of roasted meats, preferably of game, and 1 oz. chopped truffles or truffle peelings for each quart of sauce.

SAUCE PIQUANTE

Take 35 quarts of bouillon, made by boiling 45 lbs. of mixed beef and veal which have previously been cut in small pieces and roasted in butter. Add 2 glasses of good vinegar which has boiled with one onion, 2 shallots and 3 cloves of garlic, the whole being chopped. Strain through the flannel and add to the "brown stock," same as "brown sauce," after which, flavor well with "mixed spices," the juice of one lemon, 1 lb. of finely chopped vinegar pickles and 1-4 lb. of capers.

TURTLE SAUCE

Prepare same as "Sauce Madere," but using only 1 quart Madeira wine and 3 quarts of white wine. When the sauce is ready, this is to say that the "brown stock" has been mixed with the bouillon, add the juice of 2 gallon cans of tomatoes.



ITALIAN SAUCE

The Italian sauce is prepared same as the "Sauce Piquante," but instead of adding pickles and capers, add the contents of 3 cans of hotel grade mushrooms chopped and 1-4 lb. of dried mushrooms previously soaked in hot water and chopped.

WHITE SAUCE

The white sauce, also called "veloute," only differs from the ordinary brown sauce by the flour that is thoroughly incorporated, on a very slow fire, to the butter, in order to prevent it from turning brown, the proportions of flour and butter to prepare the "white" stock, as well as the proportion of meat bouillon to be added, remaining the same. When the sauce is ready pass through a fine wire cloth or hair sieve.

SAUCE BECHAMEL

The popular sauce bechamel is the same as the white sauce, but milk takes the place of bouillon, the addition of 2 eggs per quart of sauce makes it still richer.

CREAM SAUCE

The cream sauce, also called "sauce supreme," probably on account of its delicacy, is prepared same as the white sauce, with the addition of 1 quart of sweet cream to each gallon of sauce.

CANNING OF SAUCES

All the sauces can be canned and processed:

Pints	1 hr. at 235°
Quarts	1 hr. 15 min. at 235°

SOUPS.

CONSOMME

Is prepared by boiling 6 to 8 hours at very slow fire all the pieces of meat, bones, etc., which are not canned; always add a few calves heads or beef and calves feet to give it consistency; 1 lb. of meat gives 1 pint of consomme. Skim carefully, never allow to boil hard and flavor with a bunch of carrots, parsley, leek, parsnips and turnips, and a muslin bag containing mixed spices. Remove all the fat on top of the bouillon, strain through a fabric, and, if required, clarify by addition of blood, as explained under the title "Clarification of Meat Jelly." Can in tins or glass jars, seal immediately and process.

CONSOMME OF CHICKEN

Roast a few chickens, just enough to color them, 10 minutes is enough, add them to the meat, same as used for the previous consomme, and boil very slowly for 6 hours. Skim, remove the fat. Add salt and spices, and then strain, can and process.

POTAGE PRINTANIER

Fill each jar or can 1-4 of mixed carrots and turnips cut in small cubes of 1-4 of an inch, green peas and string beans cut in pieces 1-2 inch long. These vegetables must be freshly blanched or canned vegetables can be used. Fill with hot consomme or meat bouillon. Seal and process.

OXTAIL

Oxtails, feet, bones and all other parts of the beef that are not fat, are roasted in a kettle with not more grease than actually required. When well browned cover with meat bouillon and boil very slowly for 4 hours. In another kettle mix 8 lbs. of flour to 10 lbs. of melted butter, stir gently and keep on slow fire until the flour is well browned, at which time add slowly and while

stirring 65 quarts of the bouillon previously prepared. Flavor with mixed spices, pass through a hair sieve or fabric, can or jar and process.

TURTLE SOUP

Secure live turtles, kill them in the usual manner, cut the head and hang them by the hind legs to allow the blood to run out. Separate the skulls and remove the intestines and all the fat, scrape and wash the flesh with hot water, then boil 1 1-2 hours in 2 parts white wine, 1 part water, enough liquid to fully cover the turtle, add mixed spices and salt to taste, with an extra addition of Cayenne pepper, thyme and sage. Drain, pass the juice through a fabric and mix with 3 times its volume of ox-tail soup, prepared as above described, and the juice of one lemon and one pint of Madeira wine to each 8 quarts of soup.

Can, placing in each tin or jar 2 or 3 pieces of turtle. Seal hot and process:

MOCK TURTLE SOUP

Boil 2 hours a few calves head, cut in pieces, in water, adding a tumbler full of good vinegar to each 4 gallons of water, salt to taste and a little bunch of parsley and leek. Flavor with mixed spices with an extra addition of bay leaves, marjoram, basilic, and a little thyme. Then add 2 ozs. of raw ham finely cut to each 3 quarts of liquid and reboil 1-2 hour on a very slow fire. Skim carefully and add 1 lb. of "brown stock" (see Brown Sauce) to each 5 quarts of soup in order to thicken and color it. Pass through a fabric, add 1 quart of Madeira wine and the juice of one lemon to each 8 quarts of soup. Can hot in tins or jars and process.

PEA SOUP

The pea soup is also called "Potage St. Germain," and is prepared with fresh or canned peas for the high grade, with dried peas for the cheap article. Take 20 quarts of fresh shelled peas, boil them with a few heads of lettuce and leeks. When softened crush thoroughly, add equal volume of meat bouillon, thicken with "white stock" (see White Sauce"). Sweeten to taste with

sugar, add 4 lbs. of butter and pass through the hair sieve. Can and process. If canned peas are used the preparation remains the same. To prepare with dried peas soak 10 quarts over night in lukewarm water (100° Fahrenheit), in the morning drain and leave them in a bucket without water for 8 hours. This will cause them to swell and even start germination, which will greatly soften and sweeten the peas. Then cook thoroughly with water 5 lbs. lard and 5 lbs. smoked bacon, and to flavor: 1 lb. carrots, 1 lb. onions and mixed spices. When cooked crush, pass through the hair sieve, add meat bouillon if it is too thick. Can and process.

TOMATO SOUP.

Scald the tomatoes, crush them, add a little water and boil with 2 oz. of rice and 3 oz. of butter to each pound of tomatoes. When cooked crush and pass through the hair sieve. Can and process.

CREAM OF ASPARAGUS

Scrape the asparagus and cut in pieces about 1-2 inch in length. Blanch 2 minutes in boiling water, drain the water and crush without cooling off. Add 2 ozs. butter for each pound asparagus, mix thoroughly and pass through the hair sieve.

Pour back in the kettle, adding its volume of chicken or meat bouillon, thicken with white stock (see "White Sauce"). Can hot and process.

CREAM OF CELERY AND CREAM OF CAULIFLOWER

The cream of celery and the cream of cauliflower are prepared in the same manner as the cream of asparagus, merely substituting fresh celery or cauliflower to the asparagus.

BISQUE OF LOBSTER

Boil the live lobsters in just enough water to cover them. When cooked remove the lobsters and add in the kettle the same quantity of meat bouillon as it contains water in which the lob-

sters have boiled. To each quart of this mixed bouillon add 4 ozs. of ordinary rice and boil slowly for 1-2 hour. During this time crush into a paste the lobsters, meat, shell and all, then pass both the bouillon with rice and the crushed lobster through a hair sieve. Put back in the kettle, incorporate 5 ozs. of butter for each quart of the soup, spice with Cayenne pepper. Can hot and process.

BISQUE OF SHRIMPS AND BISQUE OF CRAWFISHES

The bisque of shrimps and the bisque of crawfishes are prepared in the same manner as the bisque of lobster, except for the latter which instead of being boiled in plain water are boiled in:

Water	2 parts
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White wine	1 part
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and flavoring same with a bunch of parsley, thyme and bay leaves and a few small onions.

The addition of crushed boiled salt water fishes constitute an adulteration.

PROCESSING OF SOUPS

Soups are packed in hot tin cans or glass jars and in both cases the processing remains the same.

Pints	50 min. at 230°
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Quarts	60 min. at 230°
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If in glass jars seal with Phoenix caps, lined with rubber rings and pure tin foil discs.

PATES AND POTTED MEATS

The pates are boned meat, fowl or game, packed in cans or glass dishes, all the spaces between the pieces of meat being filled with hash of an especial composition for each variety.

PATE OF VEAL

Roast with a little butter for 1-2 hour pieces of veal, the best quality of meat only being used. In another kettle roast in but-

ter also the liver, heart and other pieces of inferior grade; when cooked remove from the fire, chop and crush in a mortar and knit with 1 lb. melted lard to each 3 lbs. of the paste, spice and flavor with 3-4 oz. of prepared salt, per pound of this puree. Can in tins or glass dishes, lining first the bottom 1-4 inch thick of paste, place a layer of the roast veal which has been cut in small pieces, then a layer of puree filling, etc., making a tight pack, the last and top layer being filling. Seal airtightly and process.

PATE OF PORK

The pate of pork is prepared in the same manner as the pate of veal, but as a culinary preparation the best is undoubtedly the combination of both, veal and pork in the same pate.

Some manufacturers prefer to chop the roast veal and pork instead of cutting same in small pieces. In our opinion it spoils the appearance of the pate when same is on the table and is being sliced for eating.

PATE OF HARE

Cut the hare in pieces, remove all the bones, set the meat of the legs aside to be crushed and lay the rest in earthenware jars, packing tight and covering with a tumbler full of 1-2 good red wine, 1-2 Madeira, leaving until next day. Then remove from the jars and roast in a kettle with very little grease until half cooked, remove from the fire and cut in small pieces.

The meat of the legs is chopped and crushed with an equal weight of fresh ham until reduced into a paste. Flavor and spice by addition of 1-2 oz. of "prepared salt" per pound of paste, and the wine and Madeira in which the meat has macerated.

Mix the roasted meat with the paste and 1-4 of the total weight of fat salted bacon (not smoked) and cut in small cubes. Can in small oval tins or glass dishes. Seal airtightly and process:

1-4 lb.	1 hr. at 222°
1-2 lb.	1 hr. 15 min. at 222°
1 lb.	1 hr. 30 min. at 222°

The boxes must be laying flat while cooling off.

PATE OF RABBIT

The pate of rabbit is prepared in the same manner as the pate of hare, with the exception that to the paste made by chopping and crushing the legs with equal weight of fresh ham, the heart, liver and lungs are also added as well as the blood which is kept over night in an earthenware jar with addition of a vinegar to prevent it from spoiling.

To the spices a little serpolet (wild thyme) is added to give this pate its peculiar flavor.

PATE OF VENISON

Remove the bones and nerves and roast the venison for 15 minutes in a kettle. The most tender pieces set aside and cut in small cubes, the balance chop fine with 1-3 its weight of suet, beef or calf's fat.

Prepare the pate by mixing:

- 2 parts of venison cut in cubes,
- 6 parts of the chopped venison,
- 1 part of pork or calf's tongue cut in cubes,
- 1 part mixed salted bacon and fresh ham cut in cubes.

Flavor with 1-2 oz. of "prepared salt" for each pound of the mixture. Can and process:

1-4 lb.	1 hr. at 222°
1-2 lb.	1 hr. 15 min. at 222°
1 lb.	1 hr. 30 min. at 222°

PATES OF CHICKEN

TURKEY, DUCK, GOOSE, ETC.

Bone the fowl, lay the white meat aside, cutting same in thin slices. Chop and crush the red meat together with its weight of 2-5 calf's meat, 1-5 fresh ham and 2-5 fresh bacon. Pass the pate through a fine wire cloth sieve, so as to separate the nerves that the meat may contain.

Fill the cans by layers of the crushed mixture, thin slices of

fresh bacon and slices of the white meat of the fowl in the following proportion :

Sliced fowl	2 parts
Sliced fresh bacon	1 part
Crushed mixture	6 parts

Spice and flavor with "prepared salt" in the proportion of 1-2 oz. to each pound of pate.

Process same as game pates.

HEAD CHEESE

Cut the pork heads in 4 parts, wash them thoroughly in water and throw them in a kettle of boiling water slightly salted, flavored with a little thyme, bay leaves, cloves and one clove of garlic per head. The kettle must contain one gallon of water for each pork head. Boil very slowly for 2 hours, after which time remove from the fire and bone the heads. Remove carefully the white skin of the tongues, adding salt and pepper to taste. Pack tight in tins or glass jars. Seal airtightly and process pound jars or cans one hour at 222°.

POTTED MEAT PASTE

Potted meats, it being tongue, ham, turkey, etc, or still anchovy paste, etc., are all prepared in the same manner: Chop and crush into a paste 3-4 of the stock (tongue or ham, etc.), and 1-4 fresh bacon. Pass through fine wire cloth to separate all fibres, nerves and fragments of skin. Spice and flavor with salt and mixed spices.

Fresh pork meat may be added in variable proportion in order to lower the cost, and for anchovy paste fresh steamed herrings are used, salted anchovies being practically only added in order to flavor.

These goods are packed in large quantities both in tin and glass in England. Process 1 hr. 20 min. at 222°.

POTTED MEATS—HAM, TURKEY, TONGUE

Hash roughly the stock, it being ham, turkey or tongue and cook slowly in a kettle with melted lard and a little water; it.

must not cook dry, the water will help to soften the meat so it can absorb the lard, flavor with mixed spices, can hot in tins or glass, seal airtightly and process 30 minutes at 222°. Shake several times the cans or jars while they are cooling off in order to keep the fat well mixed with the meat.

SAUERKRAUT—ITS PREPARATION

The quality of the sauerkraut depends especially of the variety of cabbage used and the more or less improved machinery used for shredding. A good sauerkraut should be firm, long and white.

The cabbage being shredded is weighed and put in clean barrels, pressed down tight with a wide piece of wood as each layer is put in. On each layer add the salt in the proportion of 2 1-2 lbs. per 100 lbs. of cabbage, adding also a few juniper berries. When the barrel is full place the bottom boards on the cabbage and keep pressed down by a large stone or a screw press. If the barrel has been especially built for the purpose. In a few days the water secreted by the cabbage will cover the boards, it will constitute the brine and the sauerkraut is made.

COOKING AND CANNING

Wash the sauerkraut in several changes of water until all the salt has been washed off. Cook not less than 5 hours or over night, if possible, in a nickel or enameled steam kettle having a tight fit cover (Fig. 16), with 3 ozs. of lard per pound and water up to the level of the sauerkraut. It should also contain a little muslin bag with pepper, cloves and juniper.

When cooked it must be moist, but not contain any water, and, while still hot, just before canning add 1 oz. of melted bacon per pound of sauerkraut. This is smoked bacon cut in little cubes melted in the frying pan, they are poured in as well as a pint of white wine for each 10 lbs. of sauerkraut and the whole thoroughly mixed without breaking the fibres more than unavoidable. Can and process:

1 lb. cans	45 min. at 230°
2 lb. cans	55 min. at 230°
3 lb. cans	1 hr. 15 min. at 230°

Goose fat added to the first cooking greatly increases its palatability. In fact, the more fat it contains and the longer the cooking and the processing the better the sauerkraut will be.

SAUERKRAUT WITH SAUSAGE AND HAM

To the above prepared sauerkraut can be added frankfurters, or, still better, small Lorraine sausages. They must first be soaked in hot water and given time to swell, the skin being pierced with a fork to avoid its bursting. Put one or two in each can and process as above.

If ham is to be added it should first be boiled, sliced, and each slice be wrapped in calf's fringe, then put in the cans, sealed and processed.

The calf's fringe wrapper will protect the ham and it will not fall to pieces while processing as it would otherwise.

PRESERVING OF BEER

Beer is now extensively preserved, pasteurized to insure its keeping, hence the necessity of an absolutely airtight seal and here have the Weissenthanners' patents proved their supremacy, and the difficulties of preserving beer are a thing of the past.

The beer to be thoroughly pasteurized is to be processed as soon as bottled and sealed in a water bath at the temperature of 170° Fahrenheit for 30 minutes. This has, of course, the effect of stopping and preventing future fermentation; the beer can be shipped under any climate and in any season.

Partial sterilization, as practiced by many breweries and insuring the keeping of the beer for a limited period only, is made by processing the bottled beer for 30 minutes at the temperature of 140° Fahrenheit.

Experiments made by the writer have demonstrated the fact that if a bottle is sealed with a cork, an ordinary cork, the tightness of the seal depends on the pressure exercised by this cork against the inside of the neck of the bottle. This cork on account of its elasticity tends to swell back to its original diameter, pressing against the sides of the neck, and, therefore, the bigger the cork the more it has been squeezed to get into the neck, the more strength it will possess and the tighter the sealing.

But practical work has taught us that a cork can only be squeezed 50 per cent., this is to say of one-half of its thickness, into the neck of a beer bottle; its airtightness is therefore quite limited, while with the Phoenix cork, (Fig. 33), my experience demonstrates that

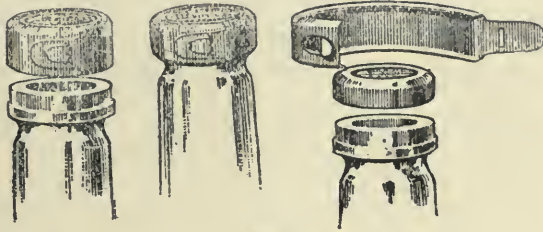


FIG. 33.

the cork washer is squeezed to one-fifth of its original thickness and is held there by a flat horizontal crimping that does not give away, even if the bottle is heated at a temperature of 250° Fahrenheit. (Boiling water 212°.)

In processing beer, to avoid breakage, raise the temperature slowly up to the required temperature. To avoid the bursting of bottles while processing be sure they are not filled too much, the heat expands the beer, its level raises inside of the bottle and compresses the air that is enclosed in the bottle. The air is very compressible and the liquid is not; if there is a very small air-space in the bottle it will not be sufficient to allow for the expansion of the liquid, and the strength of this expansion will cause the bottle to leak or to burst. With an airtight seal they will burst, therefore, great care should be given to the proper filling.

In a bottle sealed with an ordinary cork the air space is small; as the cork being driven into the neck takes a good deal of room, the bottles which are to be processed must therefore be filled much less, otherwise they would burst in processing. If the same shape of bottle is used and sealed with the "Phoenix" it can be filled 1 1-2 inch higher up with beer without reducing the necessary air space.

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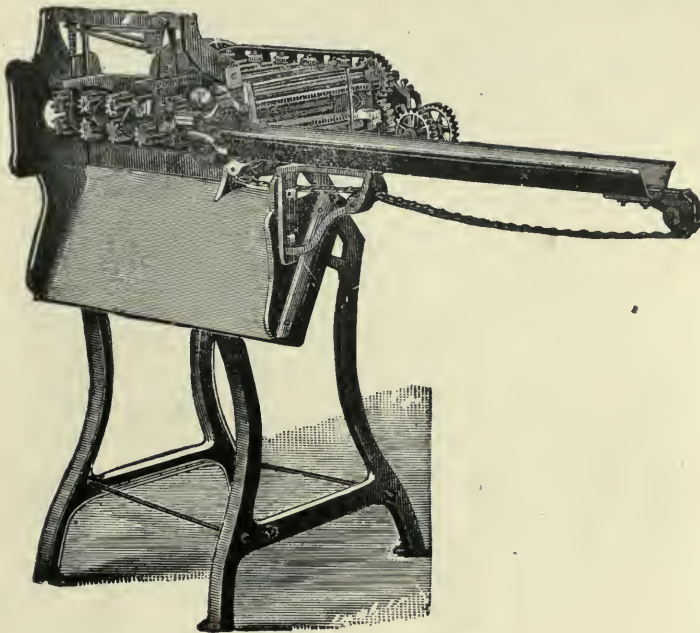
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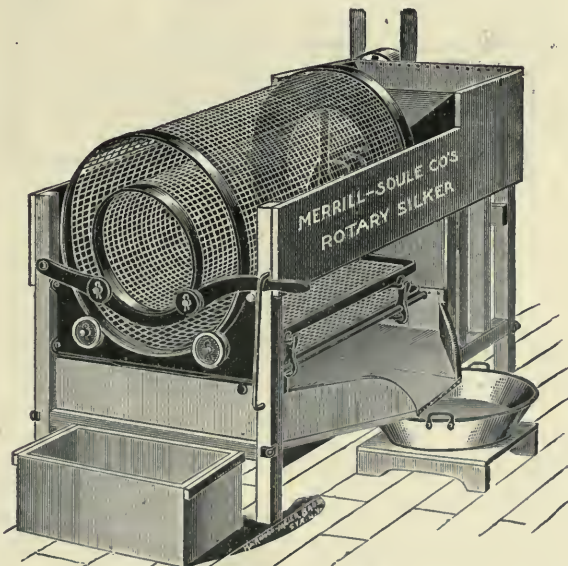
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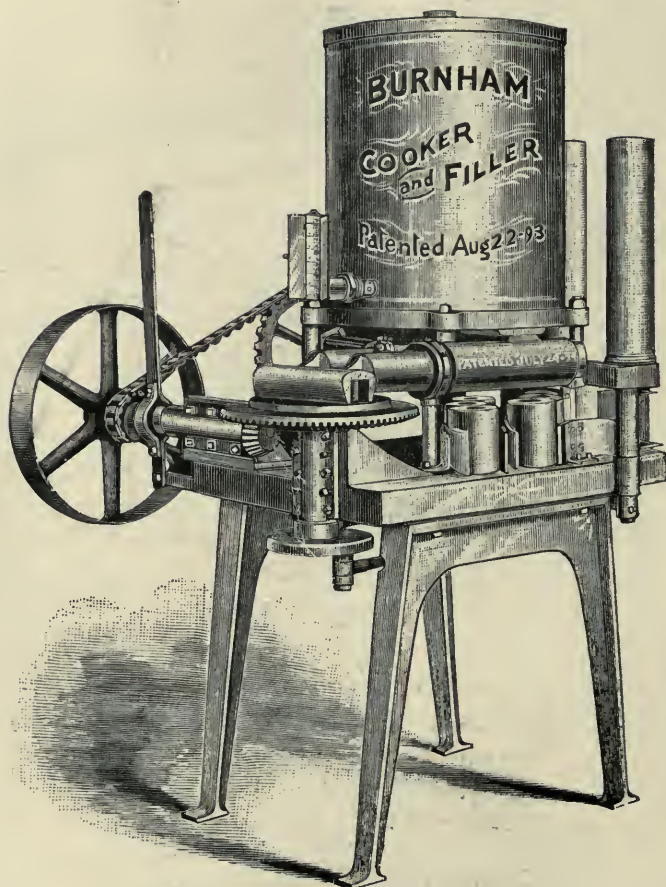
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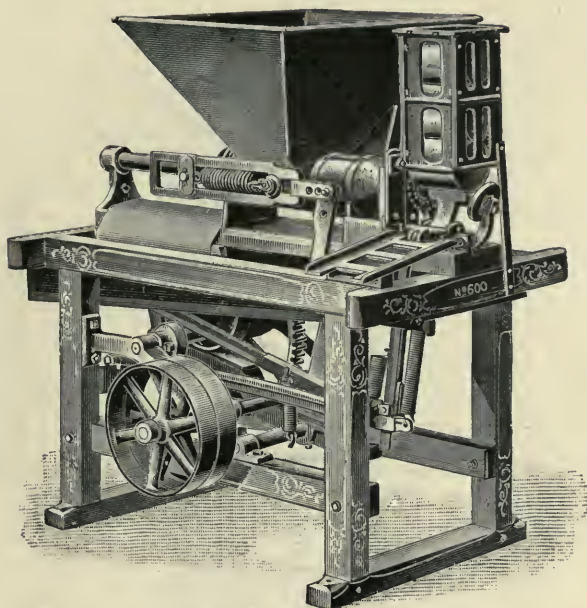
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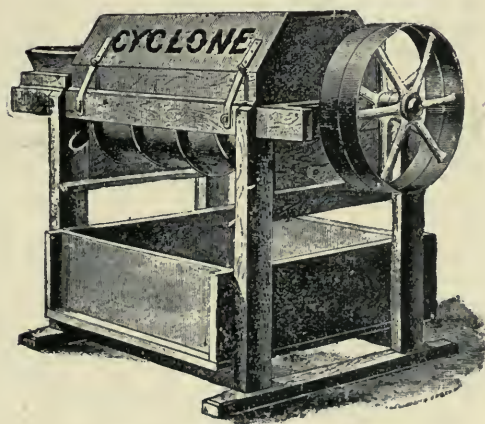
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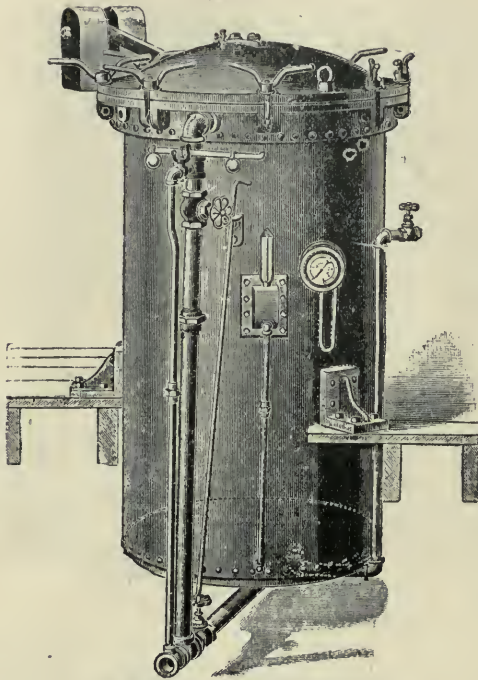


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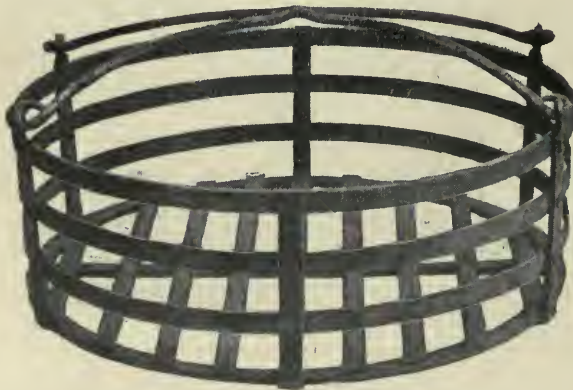
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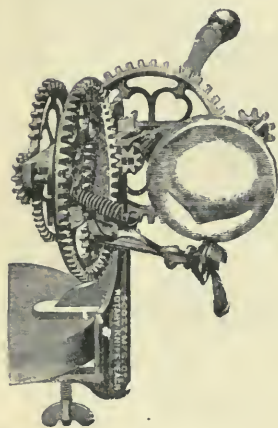
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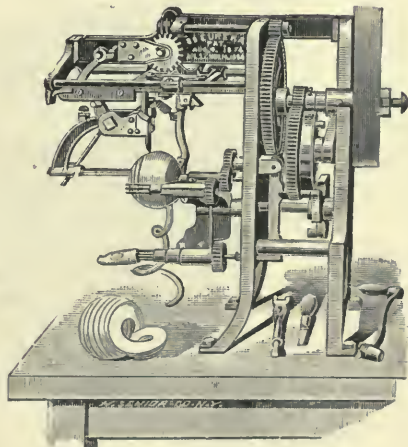
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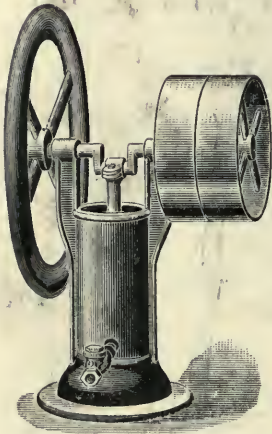
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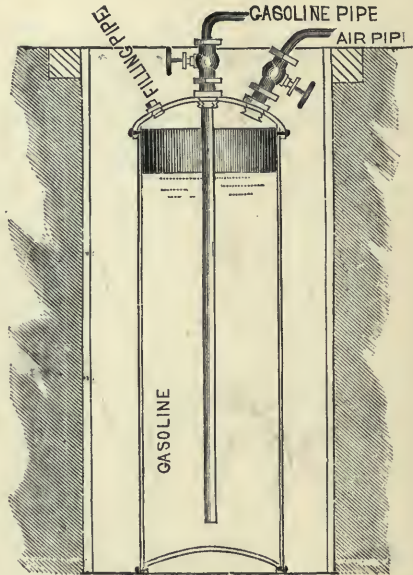
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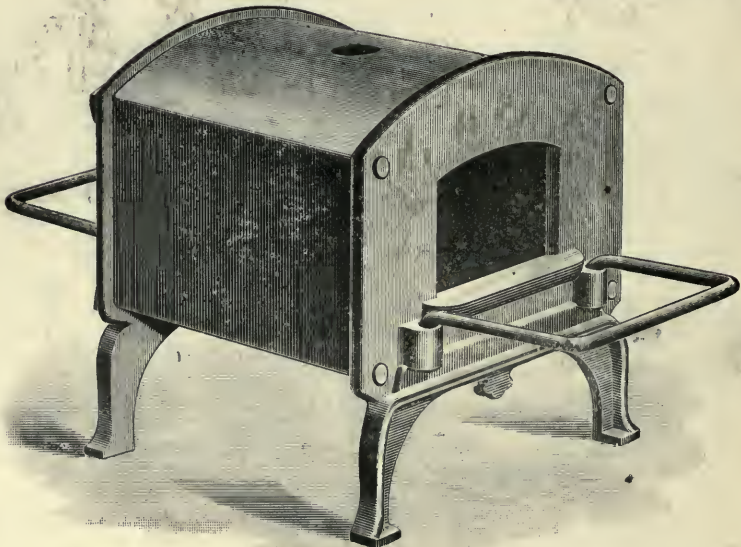
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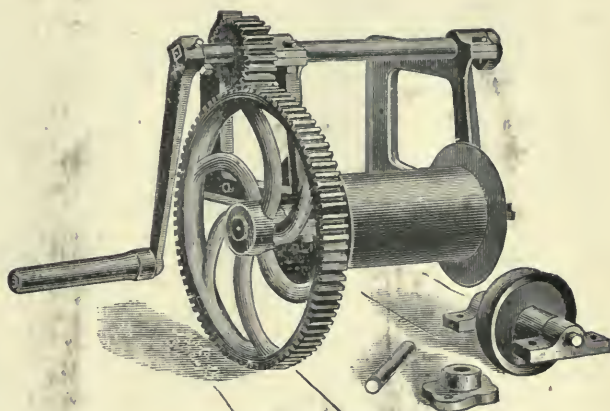
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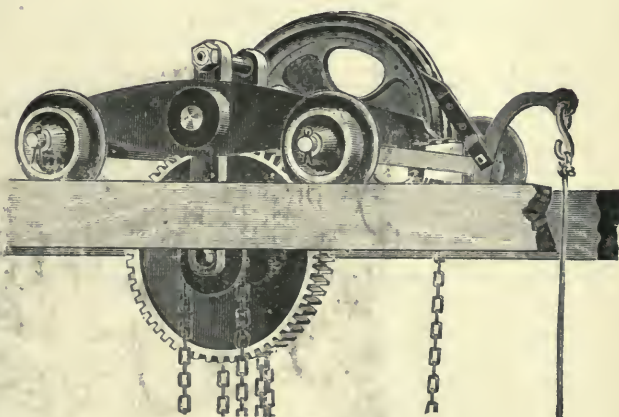
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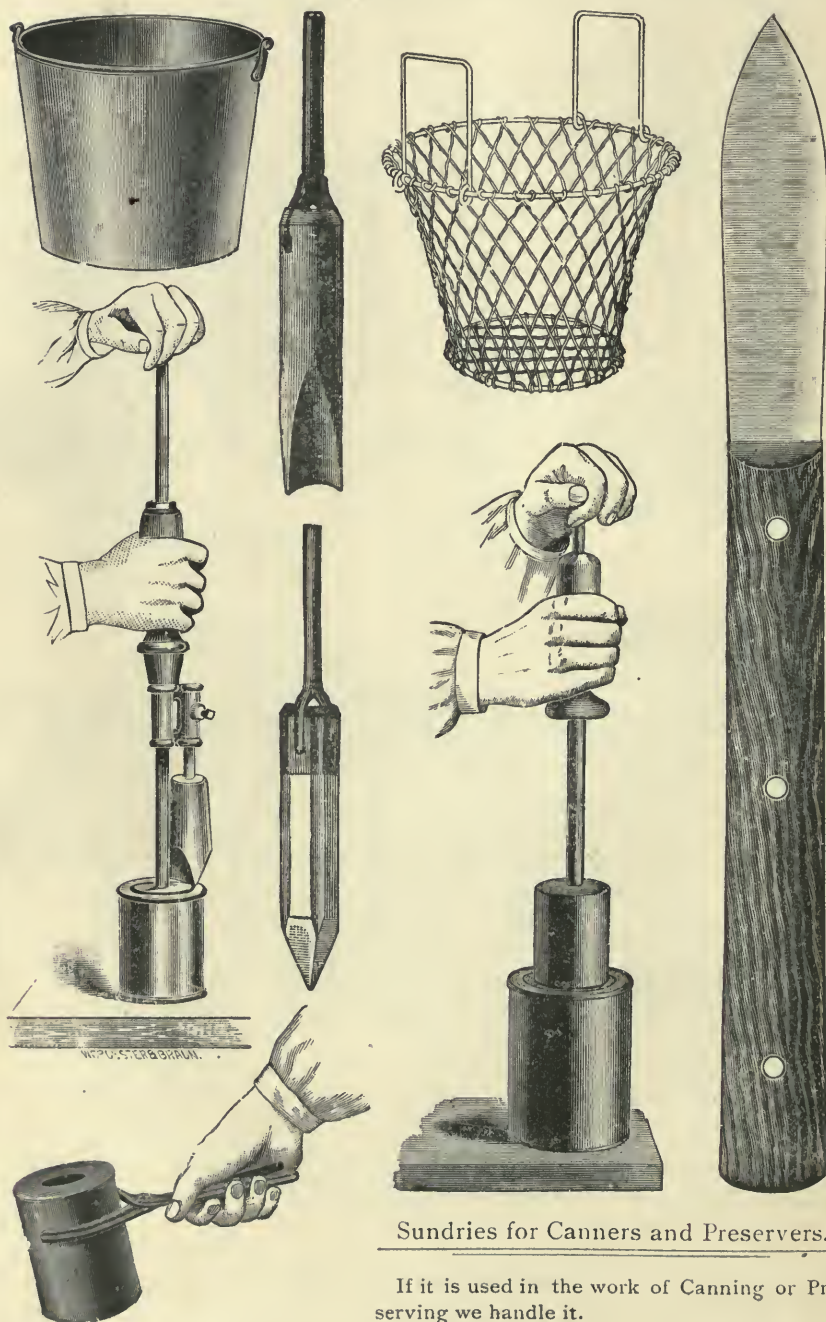


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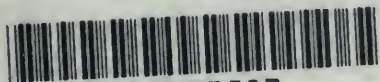
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